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Cutting Factory Costs with Conveyor System

Gravity and Power Equipment Installed by the National-Acme Mfg. Company for Carrying and Washing Screw Machine Products

Large manufacturers generally are on the lookout for improvements which will increase their output or lower their cost of production, or both. One of the most common ways of obtaining one or both of these results is to reduce the amount of hand labor by the installation of labor-saving machinery. Following its policy of adding to the efficiency of its plant wherever possible and effecting greater shop economy the National-Acme Mfg. Company, Cleveland, Ohio, maker of the Acme automatic multiple-spindle screw machine and its products, has recently installed in its product department an equipment that is of interest because of the work it accomplishes and the time and labor it saves. This is a combined gravity and power conveyor 225 ft. long, designed for carrying, cleaning, washing, drying and rust-proofing steel, iron and brass screws, nuts, bolts and various special products made by the company in machines of its own manufacture, of course.

By the use of the conveyor the screw machine products are not only carried a distance of over 200 ft. from one department of the plant to the sorting room in another part of the plant on the same floor level, where they are made ready for shipment, but during their travel they are cleaned and oiled mechanically. The machine, which has recently been placed in operation, was built according to plans worked out by the National-Acme Company with the aid of the Alvey-Ferguson Company, Cincinnati, Ohio. The latter company built and installed the equipment. The installation of conveyor equipment along similar lines is possible, and might be a source of economy in many plants where large quantities of small parts are to be conveyed from one part of the plant to another part, where the size permits them to be carried in receptacles of uniform dimensions, which is very often the case.

Fig. 1—Showing Centrifugal Separators, also Containers Through Which the Oil Flows on Its Way to the Oil Settlers in the Basement

In addition to the conveyor system other methods employed by the company in handling screw machine products in large quantities from the time they leave the screw machines until they are packed in boxes ready for shipment and including the separation of the oil are of interest. As the milled parts are completed and cut from the bar on the automatic screw machines, they fall into the base of the machines and become mixed with chips and oil. Before they can be assorted and shipped it is necessary to remove the chips and to oil and clean the parts. The mixture of parts, metal turnings and oil is put into galvanized iron pails about 10 in. in diameter and 12 in. deep, each pail holding approximately 4 gal. The pails containing the parts, chips and oil are placed on trucks and wheeled to the separating department. One day's work at the National-Acme plant, amounting to upward of 1,000,000 parts, fills over 1700 of these pails.

In the separating department the pails are emptied into machines which separate the oil from the scrap and parts by centrifugal force. Several of these machines are shown in Fig. 1. These centrifugal separators are iron shells or drums, inside of which are steel basins, allowing about ⅛ in. opening all around. A cover is screwed down tight over the basin, which contains about one pail of parts, and the basin is revolved at about 1800 r.p.m. This throws the oil through the openings but retains the metal. As the oil leaves the basin it is caught by the outer shell. It flows down the inside of this shell and through a pipe into a pail, set inside of a container somewhat larger. The container is connected by a pipe system to the oil settlers and renovating apparatus in the basement. As it flows from the separator,

Fig. 2—View Showing First Operator Placing Box of Parts on Carrier, with Return Conveyor with Empty Boxes Above Waiting to Be Filled—Shaker and Scale for Weighing the Mixture of Parts Are Shown at the Left

the oil contains a large amount of fine metal chips, but when it runs into the pails much of this sinks to the bottom, where it remains as the oil overflows.

The operation of the oil settlers is much the same as the pails excepting that the process is aided by a temperature of 220 deg. F., which lowers the specific gravity of

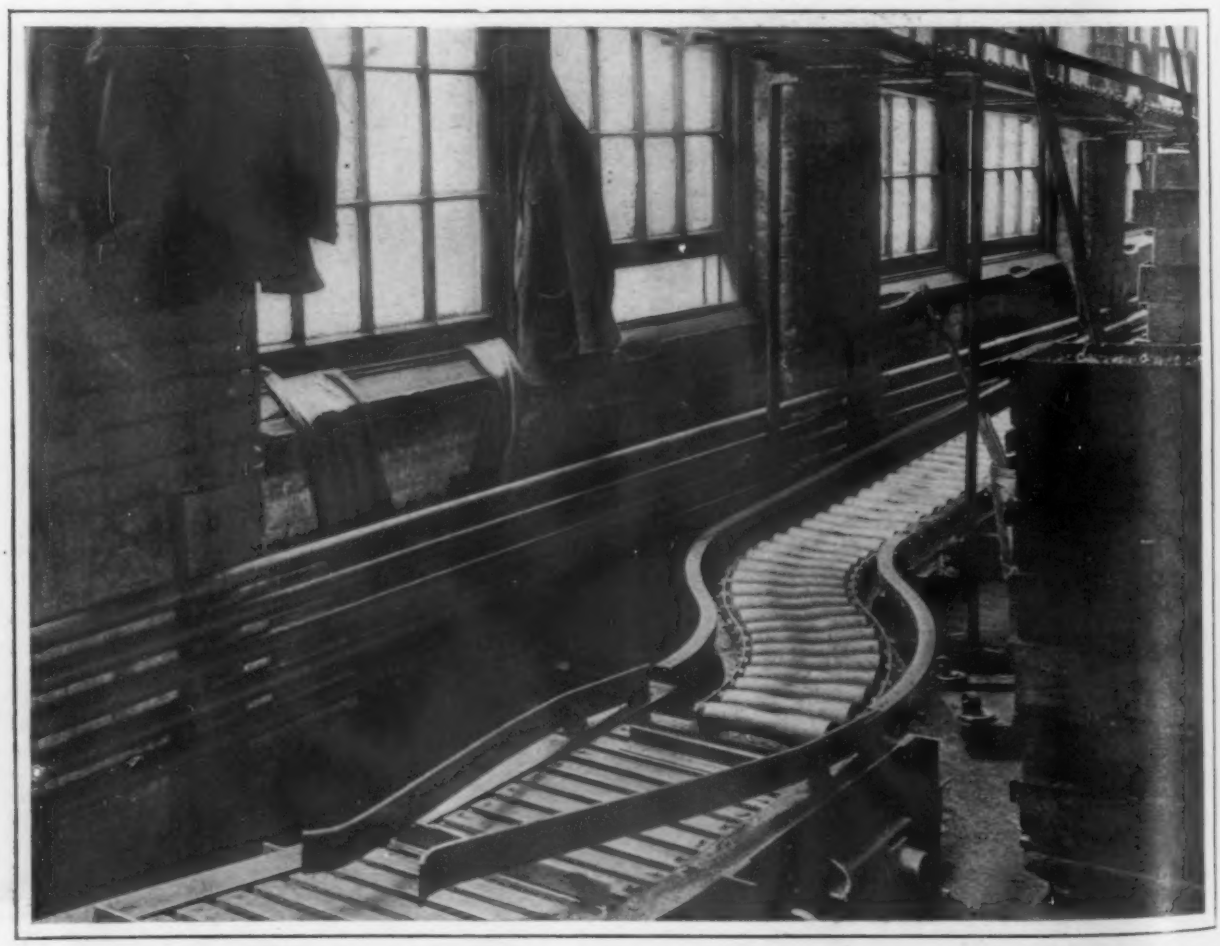


Fig. 3—Lower End of the First Gravity Conveyor and the First Power Section, the Latter of Which Is Provided with Steel Springs for Straightening the Boxes. Above Is the Return Crate Line at Nearly Its Greatest Hight

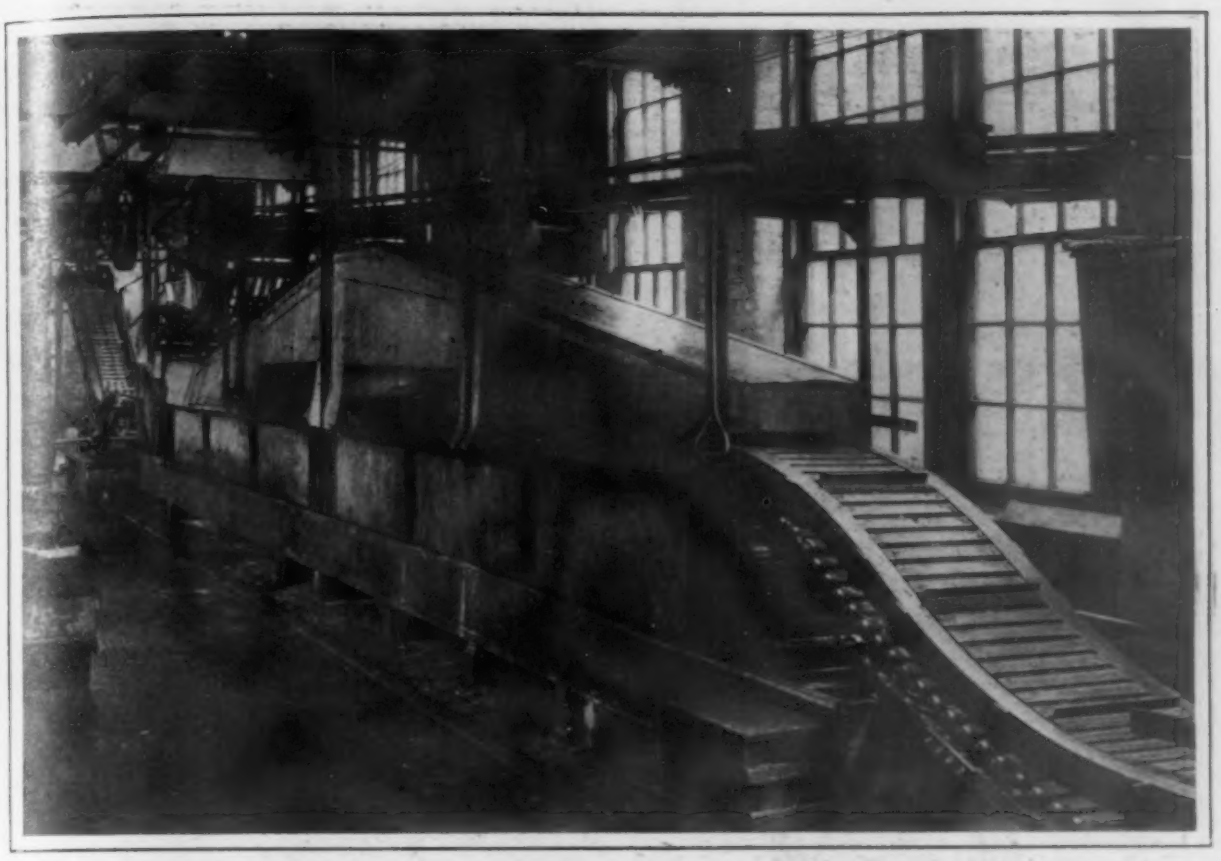


Fig. 4—View of the Washer Inclosed in Galvanized Sheet Case. At the Left Is the Last Power Elevator Which Raises the Parts to the Gravity Section, Conveying Them to the Sorting Room

the oil, and allows the remainder of the metal to sink to the bottom. After being cooled in a second tank, the oil is run into a third one and is reheated to 230 deg. About 1000 gal. of oil a day is renovated in the manner outlined.

When the oil has been removed from the scrap and parts, the metal is weighed to arrive at the total amount of

Fig. 5—The Two Tanks Before Being Inclosed, Showing How the Power Section Carries the Parts Out of the First Tank to Drain Before the Second Dipping. Back of the Return Line Is the Exhaust Fan and to the Left the Second and Third Operator

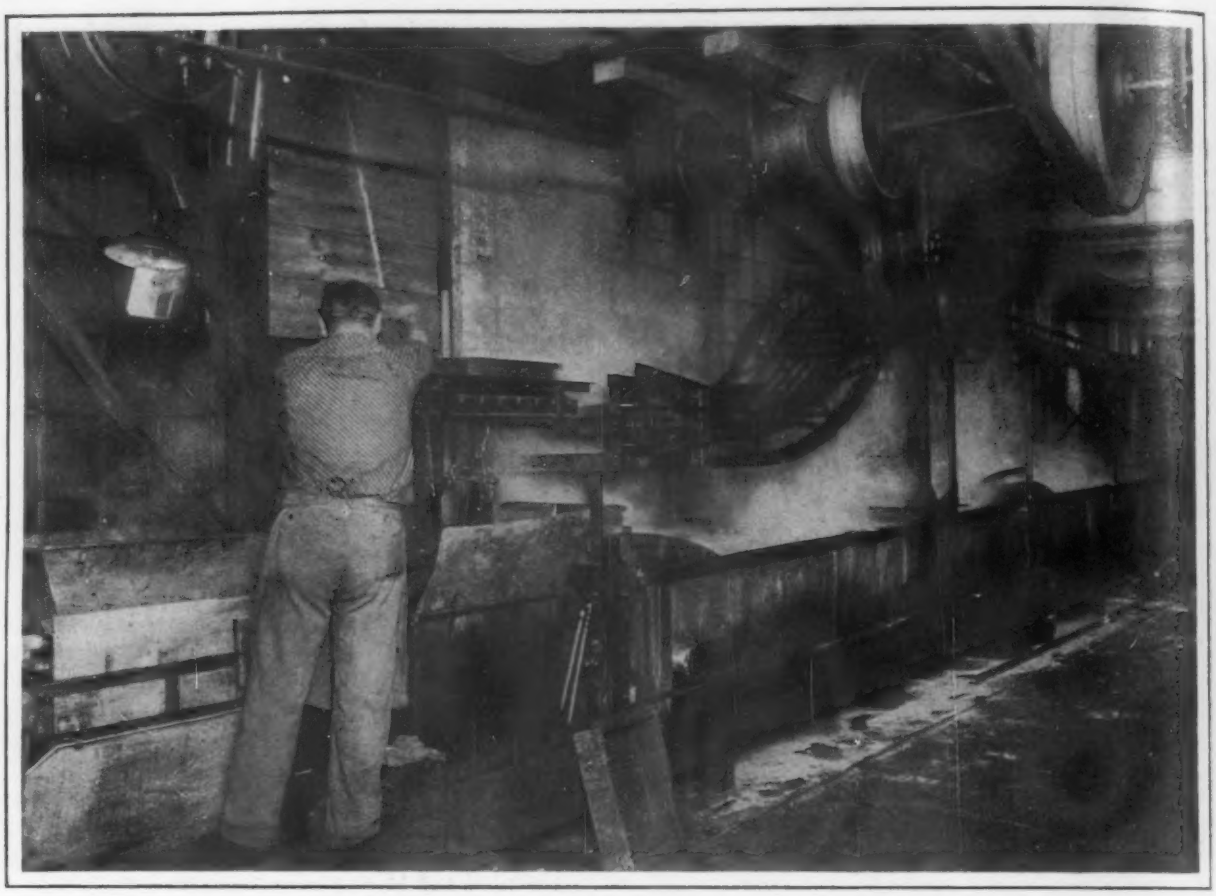


Fig. 6—Second Operator Placing Empty Crate on Power Elevator of Return Line. This also Shows the Box of Parts Leaving the Second Tank and About to Go Under the Oil Bath, and at the Extreme Left the Hand of the Third Operator Placing the Empty Box Under the Chute

metal cut, this weight being checked with the quantity of stock delivered to the screw machines. The parts and scrap are then put into screened shakers or power riddles and are rapidly vibrated. The fine chips fall through the mesh into a scrap box below, and the large shavings are combed out, leaving the good parts in the screen. Fig. 2 shows one of the shakers in operation, the end of the conveyor appearing in the background.

Under the old washing process the parts were taken from the shakers, put into wooden mill boxes, then loaded on trucks and hauled about 150 ft. to the washing tanks. There they were emptied into wire baskets, which were dipped into a hot solution of soda water. This took a large percentage of the fine chips and grit from them. After being taken out and drained, the basket which contained the parts was dipped in a second solution of soda water. This made the cleaning more thorough, especially on complicated pieces. After the cleaning and draining were completed, the steel parts were dipped into a tank of warm water, on the top of which was a film of light loom oil. As the parts were warm a certain amount of oil coated them and acted as a preventive against rust during shipment and storage. The parts were then dumped into boxes again, loaded on trucks and hauled to the sorting room. Good work was produced by this method, but it was slow, and the five men who were required in its operation interfered with one another.

The new conveyor system includes both gravity and power sections, the parts being elevated by short power conveyors and sliding down on rollers on long gravity sections. The parts are first conveyed in perforated steel mill boxes. After being cleaned and oiled they finish their trip to the sorting room in wooden boxes. The metal boxes are 17½ x 10½ in. and 5 in. deep. The wooden boxes are 21 x 12½ in. in size and 5 in. deep. Each type is designed to carry about 40 lb. of products. The parts, on leaving the shakers, are placed in the perforated steel boxes and are set on the first gravity section of the conveyor by the first operator, as shown in Fig. 2. At this point the rollers of the carrier are about 3 ft. from the floor. The upper section of the carrier, as illustrated in this photograph, is the return crate line with the steel trays waiting to be filled. The scale shown in the background is for weighing the mixture of parts and chips.

The boxes travel by gravity for about 65 ft. to a point about 1 ft. above the floor, where they are caught by the first power section, Fig. 3, and raised about 2 ft. over the end of the first washing tank, as shown in Fig. 4, and then through a solution of boiling hot soda water. This tank is 2 ft. wide, 2 ft. deep and 15 ft. long. The solution consists of 150 lb. of soda ash dissolved in 300 gal. of water, and is kept hot by a pair of 5-ft. steam pipes, one on each side, which exhaust live steam into the solution through holes 4 in. apart.

After the parts pass through the first tank they are carried up over the end and drained. This one dipping takes most of the oil and fine chips from the parts and perhaps the simpler pieces would not require a second washing, but to ensure the thorough cleaning of all the parts they are sent through a second tank identically the same as the first. Other views of the tanks are shown in Figs. 5 and 6. After passing through the second tank even the most intricate parts are found thoroughly cleaned. It takes 45 sec. for a box to go through both tanks and the time required to go the full length of the machine varies from 1¾ to 2 min. About 2000 of these boxes or 40 tons of parts are washed by the machine every day. Once a week the tanks are cleaned and are found to contain about a ton of chips and metal dirt, about seven-eighths of this being found in the first tank.

After the parts leave the second tank they pass under a row of nozzles from which flows loom oil. The parts, being hot from the boiling water, take the oil readily and become coated, and they are ready for sorting. After the oiling process the second operator takes the tray and empties it through a chute into a wooden mill box, which is placed there by a third operator. The second operator then sets the empty steel tray on the top power line above the tanks about 5 ft. from the floor. This power section, as shown in Figs. 5 and 6, elevates the tray about 2 ft. more to give it incline enough to carry it back to the starting point, where it is refilled. While the empty steel box is being started back the third operator starts the wooden box, now full of parts, forward, and puts another empty one below the chute. Fig. 6 shows the second operator starting the empty box back and also the arm of

Fig. 7—Showing the Fourth Operator Taking Boxes from the Conveyor in the Sorting Room. At the Left Are the Sorting Girls at Their Benches and Some of the Boxes of Parts Waiting to Be Sorted Standing on Low Wheel Trucks

the third operator at the extreme left placing the empty box under the chute. Both these operators will be eliminated by changes that are to be made which are referred to later, and the steel boxes will go right through to the sorting room automatically.

The full box runs down an incline for a few feet and another power elevator shown to the left in Fig. 4 raises it about 8 ft. above the floor, where it starts down an incline through an opening in a brick wall and down the rollers of a gravity section for a distance of about 75 ft. to the sorting room. Here the fourth operator unloads the boxes and places them on low trucks. They are then hauled over to the sorting benches, where they are tested for accuracy of size and thread; here the bar ends and imperfectly finished parts are taken out. The last section of the conveyor and the fourth operator are shown in Fig. 7. In this picture several of the sorters can be seen at their benches at the left.

The power sections of the conveyor are belt driven from a 3-hp. motor, which has been found ample for the requirements. The washing machine equipment is turning out over twice as much work as the former method, which required five men. While the equipment at present requires the services of four men, the amount of labor required will be reduced by putting in a new link at the point where the parts are handled after being oiled, and this will allow the steel mill boxes filled with parts to go the full length of the machine from the shakers to the sorting room. The equipment will then require only one man to feed it or place the trays on the rollers, one man to take them off in the sorting room and a third operator—a boy—to haul the empty boxes back by means of a truck. This change will also shorten the time required for the parts to go through the machine, and it is expected that two men and a boy will be able to turn out more than twice as much work as five men did when the washing and hauling were done by hand.

After the photographs, shown in Figs. 5 and 6, were taken the washer was enclosed in galvanized sheet iron, as shown in Fig. 4, with an exhaust fan placed in the side wall to draw off the steam and moisture. A sheet-iron gate hangs over the conveyor where the parts pass into the washer. This gate is pushed open by the box and closes by its own weight. Having the washer enclosed eliminates dampness in the room, which might make the air unhealthy for the workmen.

A Remarkable Gandy Belt Record

Only those who have been through a brick-making plant and therefore realize the immense amount of grit that is constantly flying about and eating its way into the various equipment can appreciate the significance of a letter received by the Gandy Belting Company, Baltimore, Md., from the Bessemer Fire Brick Company, Birmingham, Ala. The main drive belt at this plant is an 8-ply, 26-in. Gandy and has been in operation for over 27 years, during which time the plant has not been shut down, except for repairs to the machinery. In the early part of January the driving belt pulled out at the old lace holes where leather lacings formerly used had been changed to belt hooks. This is the first time the belt has given the least trouble in the manufacture of over 140,000,000 fire bricks that have been turned out during its service. The owners are simply splicing on a new piece of belt to repair the damage, and the belt has continued in service and looks good for a long time. The Gandy Company states that this remarkable record is by no means an isolated case. It makes a specialty of belts for this class of work, and in fact all conditions where the belt is subjected to particularly hard usage.

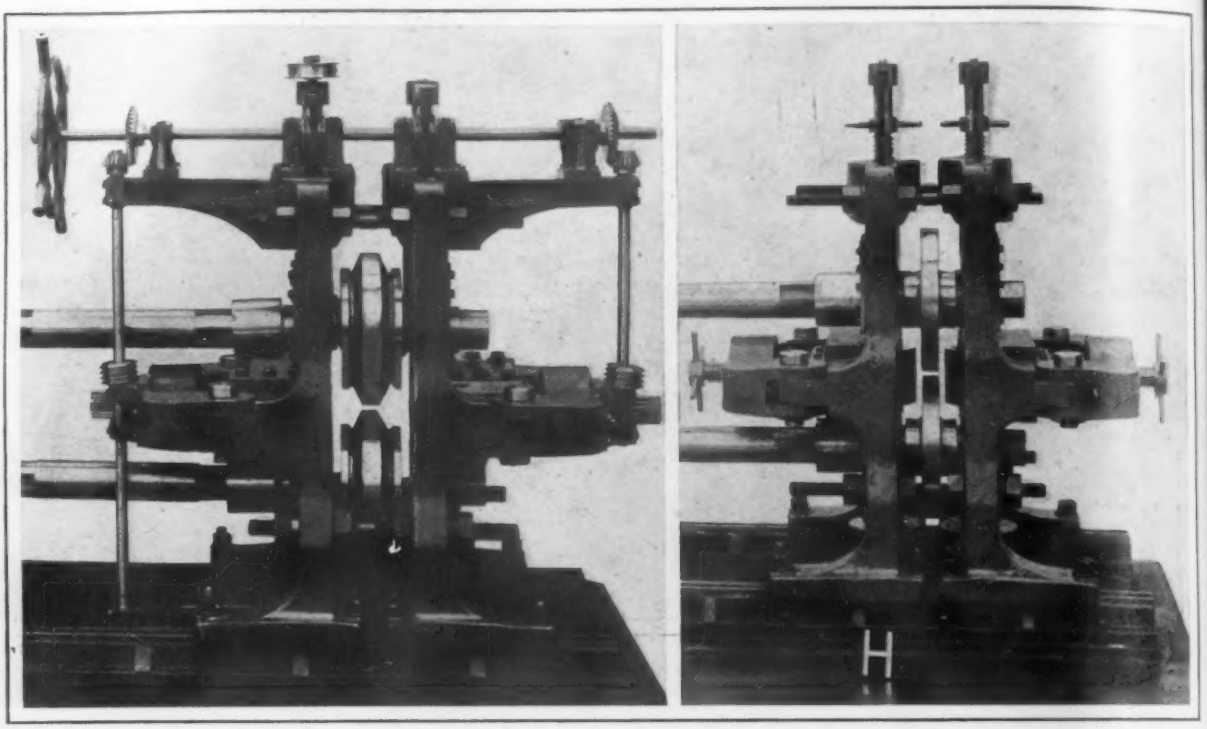
The International Harvester Corporation, chartered under the laws of New Jersey, with an authorized capital stock of $70,000,000, will have as its president William L. Saunders, now president of the Ingersoll-Rand Company. This corporation has been formed to take over the business and properties of the International Harvester Company in foreign countries, comprising Canada, France, Sweden, Germany and Russia, in addition to certain plants in this country at Akron, Ohio; Milwaukee, Wis.; Newark Valley, N. Y.; and the Plano, Tractor and Weber works, located in Chicago. At these domestic plants no harvesting machinery or binder twine is made. Its capital stock is made up of $30,000,000 7 per cent. cumulative preferred and $40,000,000 common.

Goebel System of Rolling I and H Beams

Shapes with Parallel Flanges 27 1-2 In. in Width and 39 1-2 In. Hight of Web

An interesting system of rolling mill machinery for taking the bloom or other rectangular shape of steel and rolling it in four different sets of rolls to a shape with parallel flanges, such as H and I girders, beams and columns, has been invented by Wilhelm Vassen of Aachen-Forst, Germany. It is known on the Continent of Europe as the Goebel System and a patent was granted on it by the United States on April 30, 1912. The accompanying illustrations, which show three of the four sets of rolls, will help in giving an idea of the system, but it should be emphasized that the process is claimed capable of rolling shapes with the parallel flanges as wide as 27½ in. and with the web as high as 39½ in. It is understood that Albrecht Brandt, 233 Green street, Wilkinsburg, Pa., is taking care of the interests in this country of the owners of the patent.

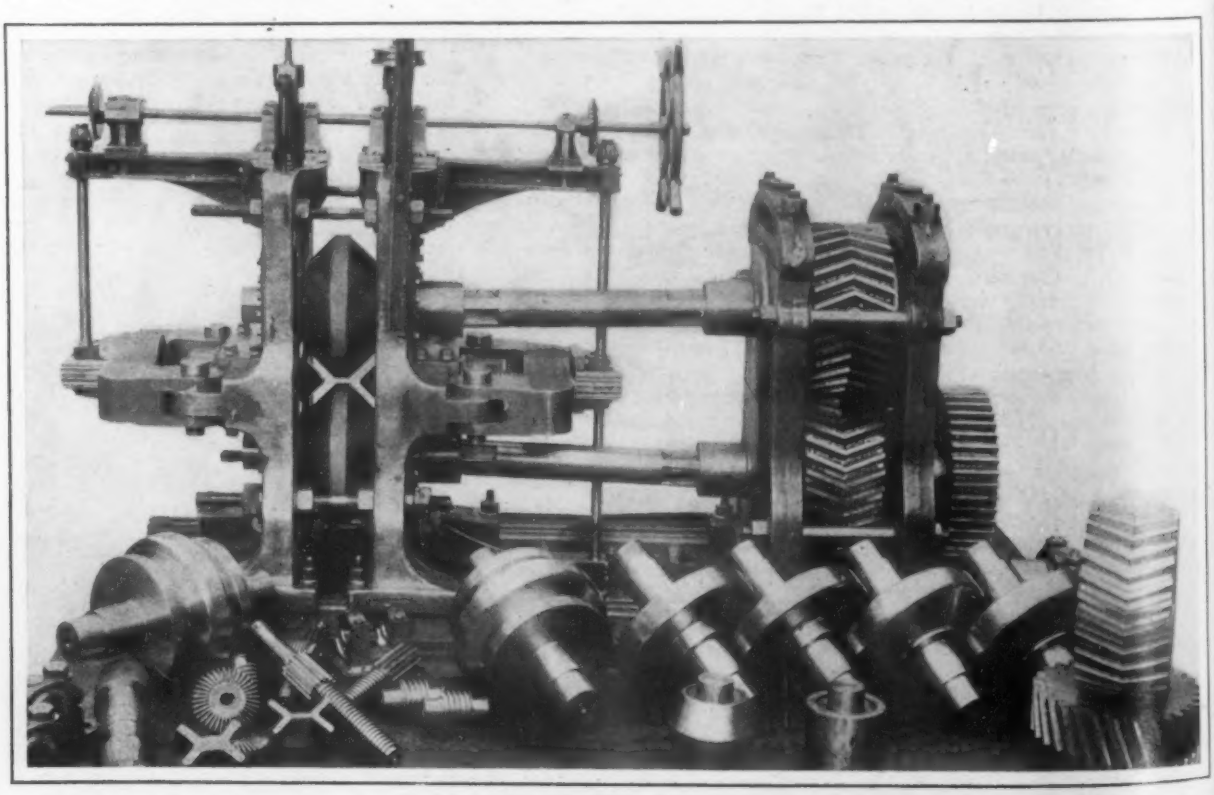
One of the illustrations shows the rolls of the first mill, where the rectangular section of the metal is rolled out into the bent up form indicated by the space between the rolls, of which there are four, all in the same plane,



Third and Fourth Mills of the Vassen Patent: At Left the Rolls for the Edges of the Flanges; At Right the Rolls for Straightening

two rolls vertical and two horizontal. The rolling faces of the vertical rolls penetrate into the shorter sides of the block of metal being rolled, and are inclined to each other at an acute angle, as sharp as possible, lying between 60 and 90 deg. The horizontal rolls work simultaneously into the longer sides of the block.

In the next mill, where further rolling takes place, the



First Mill of the Vassen Patent for Rolling I and H Shapes

corners of the block are rolled out and broadened. There are similarly four rolls all in the same plane and the angle of the faces of the vertical rolls is greater and the angle of the faces of the horizontal rolls accordingly smaller than in the case of the first pass. As there is an opening at the four corners of the metal, or, in other words, between the rolls, the edges of the flanges are not operated on, so that there is nothing in the way of the free extension of the flanges. The angle of the rolling faces of the side rolls in the second mill lies between 120 and 135 deg. and, of course, there is the usual adjustment by means of which the four rolls may be caused to approach each other uniformly, and the profile of the resultant product made any desired size.

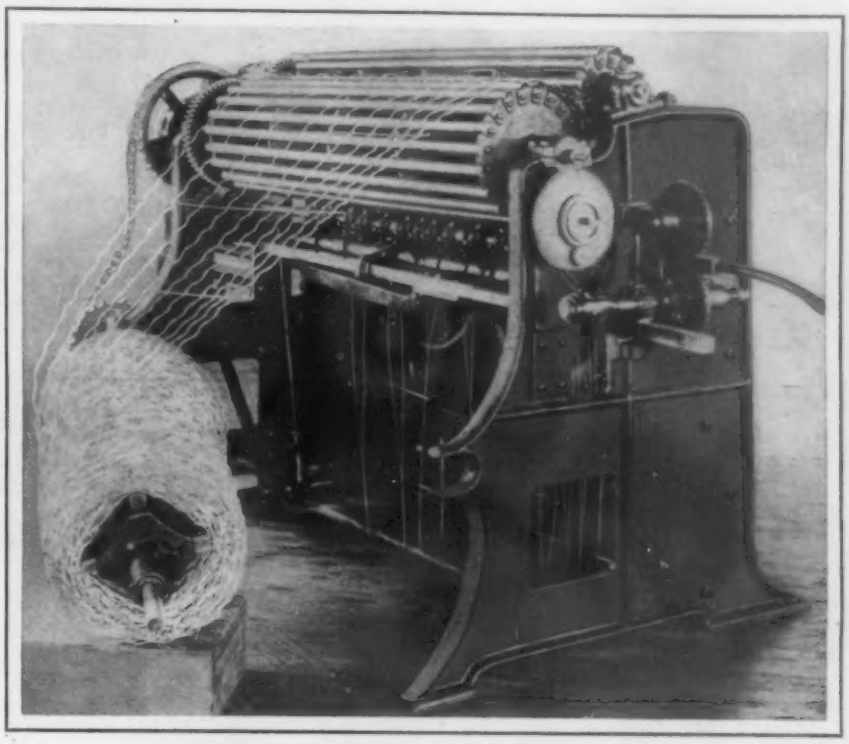
The next process covers the working of the edges of the flanges, and one of the illustrations shows how this is accomplished with a pair of horizontal rolls of special shape. In the final rolls, which are also shown, the bar is straightened, and this mill also comprises four rolls, two horizontal and two vertical, all adjustable by means of pressure screws, by means of which the section is straightend up.

The claim of the patent is that the system is a method of rolling girders, columns and similar pieces of H and I cross sections, with parallel flanges, by passing a blank consisting of a block of rectangular cross section through a four roll block rolling mill, the rolls of which are adjustable on all sides, and the passes of which are open at the four corners; that in this mill the block is given a cross section with flanges inclined to each other at 60 to 90 deg.; that by passing the bar through a second similar set of rolls the flanges are flattened out to 120 to 135 deg.; that in another set of rolls the edges of the flanges are operated on, and finally the system comprehends straightening out the flanges and finishing the bar in a final set of four rolls with cylindrical vertical rolls.

An Improved Machine for Making Wire Fencing

A new loom in which the lateral and stay wires are crimped, and the latter cut to any desired length automatically, has been developed by the International Wire Fence Machine Company, Battle Creek, Mich. The special advantage claimed for fencing made by this machine is that each lateral wire is a cable composed of two strands of No. 12, 13 or 14 wire, twisted together to form a complete cable wire. The stay wires which are No. 9, 10 or 11 gauge or even heavier are crimped and woven into the lateral cable wires any desired distance apart.

The machine stops itself, crimps both the lateral and the stay wires and cuts the latter to any desired length automatically. Should the wires become tangled in the weaving process, the machine will stop instantly without any attention on the part of the operator. Another feature of the loom is that if a certain number of rods of fencing is required, it is simply necessary to set the indicator and when the quantity is completed, the machine will stop.



A New Loom for Weaving Wire Fencing Built by the International Wire Fence Machine Company, Battle Creek, Mich.

The capacity of the machine is 60 rods of completed fence per hour and it is possible to remove a completed roll of fence from the machine and start a new one in 3 min.

Record Concrete Laying for Brier Hill Open-Hearth Plant

Pouring tower efficiency had an interesting and perhaps somewhat unique development in the construction of large concrete retaining walls and foundations for the new open-hearth steel plant of the Brier Hill Steel Company, Youngstown, Ohio. From the middle of June until November 15, 40,000 cu. yd. of concrete have been poured, an average of about 45 cu. yd. per hour of actual work. A record of 50 cu. yd. in one hour was attained.

The tower itself was not unlike the usual pouring tower with elevator skip from mixer to chutes. But the tower, mixer and electric driving machinery were all mounted on a large flat car. Trackage was continually laid just ahead of operations, and the tower in this way was maintained in the center of the working zone, the pouring continuing without interruption from whistle to whistle. Parallel with the tower track ran light tracks for the small service cars, which ran in trains of six. These were filled by a patented unloader direct from the cars of cement and aggregate standing on the railroad switch; the cars were run to the tower by cable and there emptied into the mixer charging-skip. With the exception of the small amount of sand and lime in the cement, everything in the concrete had gone through a blast furnace. In place of sand, granulated slag was used.

Johns-Mansville Building Material

The H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York, describes a building erected by the Northern Electric Heat & Power Company, South Porcupine, Canada, which is roofed with J-M Asbestos roofing and sided with J-M Asbestoside. The temperature there frequently falls to 40 deg. below zero. The material required for this building was therefore something that would prove effectual insulation against excessive cold and at the same time would not crack and go to pieces under low temperature, which would withstand the melting snows of spring without rusting or decaying; which would not dry out and run during the short but often hot Canadian summer; also that would afford perfect fire protection. Tests were made which resulted in the selection of the material above referred to. These tests were further so satisfactory that a number of other property owners adopted the same material in their rebuilding operations, following the destructive fire of 1911.

It is announced that the semi-annual meeting of the National Machine Tool Builders' Association will be held at Hotel Astor, New York City, May 15 and 16.

The Jackson Iron & Steel Company, Jackson, Ohio, blew out its blast furnace January 2 and it is now being relined.

Manufacturing Burden Obtained Monthly

The Departmental System of the Gilbert & Barker Mfg. Company—Widely Detailed Cost Analyses a Special Feature

The cost system of the Gilbert & Barker Mfg. Company, Springfield, Mass., has been developed to perform the important function of procuring accurately each month the burden cost by departments with its percentage to productive labor. The company, therefore, has at frequent intervals, the exact knowledge upon which to base its estimate of future costs. In most works this all important percentage is obtained annually, when the books

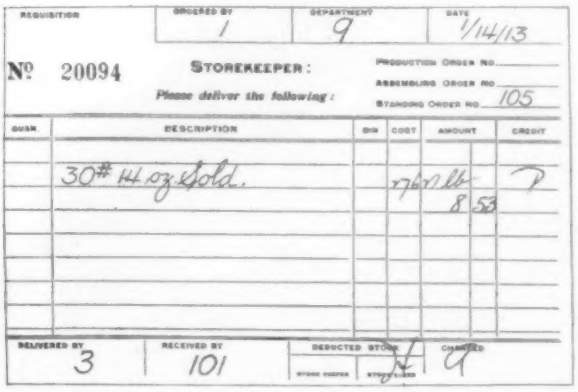


Fig. 1—The Requisition for Material from the Storekeeper

are closed and the management must wait a year before the burden charge can be changed intelligently. As a matter of fact, the interval is more than a year; it runs from January 1 until such time after the following New Year as the task of closing the books shall have been completed, which may be two or three months.

In arriving at these important totals, the Gilbert & Barker system gives a complete analysis of storehouse deliveries of materials to the factory; the detailed record of each order; an analysis of the manufacturing burden into its elements; a weekly recapitulation of labor, for manufacturing and burden, by departments and by the individual workman; a recapitulation of storehouse shipments by months, and a recapitulation of factory output by departments by months.

The monthly statement of manufacturing and burden accounts by departments is of unusual interest. As the productive labor is divided between that applied to completed product and that applied to work in progress, it is possible to subdivide the burden on this basis to procure the percentage which must be employed to clear the ledger balance of burden. It will be noted that the system acts in combination with the storehouse records to give a complete running inventory of raw materials, manufactured products and work in progress.

Every daily time card or job ticket and every requisition for material goes from the factory to the cost department at the end of each day. Each requisition Fig. 1 is numbered in consecutive order and must be accounted for daily. If one is spoiled, or is not required through any change of plans or otherwise, it must be turned in marked

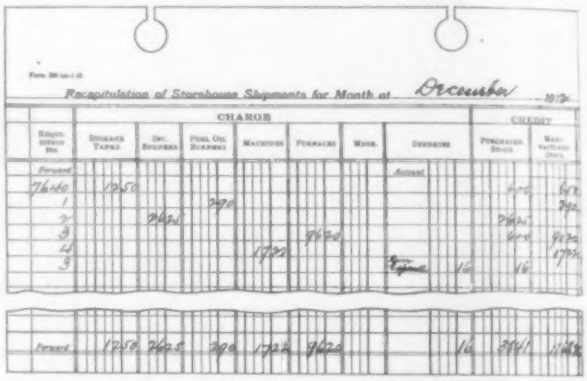


Fig. 2—The Monthly Recapitulation of Storehouse Deliveries to the Factory

"void." In this way an absolute check is maintained on the delivery of all goods from the storehouse; that is to say, of everything which enters either into work in progress or into the burden.

In Fig. 2 is shown the recapitulation of storehouse delivery to factory for each month. When the requisition has been priced and totalled it is recapitulated by departments to burden or manufacturing and credited in the right-hand column of the sheet either to purchased stock or manufactured stock as the case may be, every item which is requisitioned being debited and credited. This

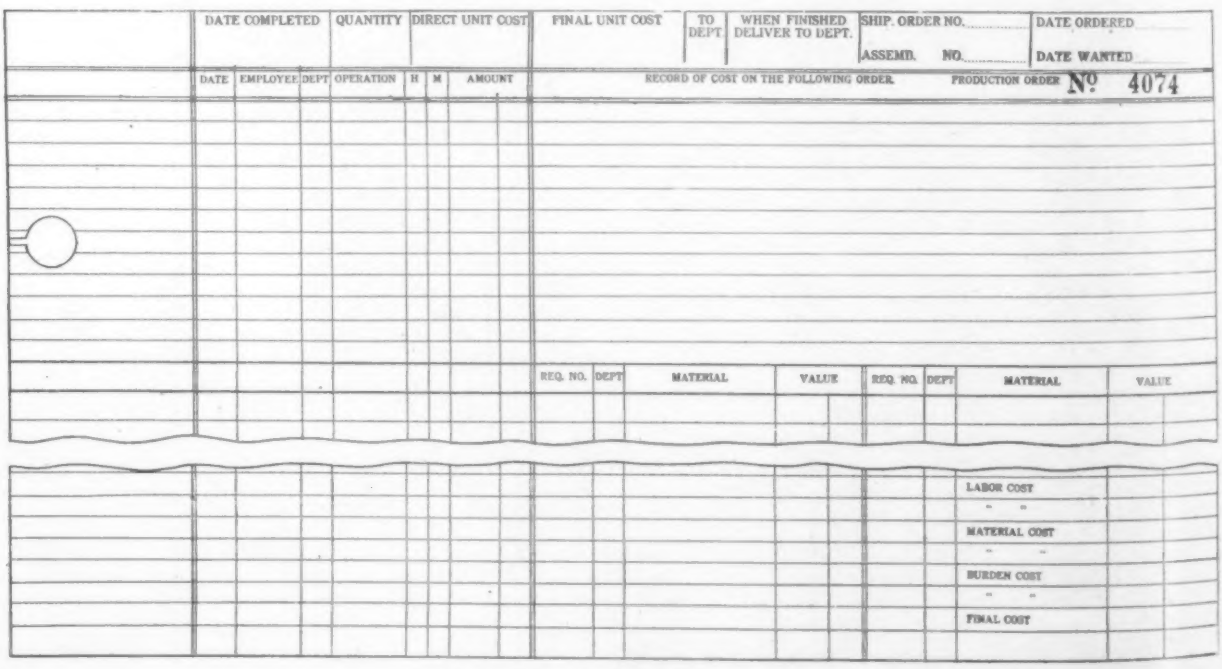


Fig. 3—The Individual Order Cost Sheet

BURDEN ACCOUNTS

NAME Repairs To Buildings S. O. No. 122

CREDITS TO BE SHOWN IN RED. DEPARTMENT

DATE	EXPENSE ORD. NO.	EXPLANATION	LABOR	MATERIAL	SUNDRIES	DATE	EXPENSE ORD. NO.	EXPLANATION	LABOR	MATERIAL	SUNDRIES
1/17/12	160	Rep. Well	2 50					TOTALS			
	"	"	2 75								
		1000 Brick		4 00							
		1 load sand		50							
		Lime		2 00							
1/20/12		Voucher # 727 Spirit Red			6 00						

Fig. 4—The Burden Account Cost Sheet

form is for convenience in the subdivision of material by departments and by manufacturing and burden, so that at the end of each month the grand totals may be transferred by voucher entry to the manufacturing and burden accounts of the general ledger.

This having been accomplished the items of the requisitions are charged to the individual order on the cost sheet Fig. 3. When the requisition is chargeable to a burden account it is posted to the burden account cost sheet Fig. 4 which is indexed by the standing order accounts; that is, each division of burden is carried as a separate account.

In Fig. 5 is shown the form for the recapitulation of job tickets for each week by departments. The tickets upon arrival from the factory are rated and extended. On the sheet against the number of each employee is entered the total amount to be charged to manufacturing and the total amount to be charged to burden, these entries being made daily. The column headed "lost time" is used in adding or subtracting any difference under 3 cents resulting in a week because of the giving or taking of fractions of cents in totalling the job tickets. Anything more than 3 cents is investigated. At the end of each week a total of the job cards of both manufacturing and burden must equal the total money paid to employees, the pay roll being made up from the weekly clock cards. The system thus acts as a perfect check against discrepancies between money paid in wages and the work which is performed by the employees.

At the end of each week the total amount of the pay-roll is vouchered by departmental manufacturing and burden to the debit of the manufacturing and burden accounts of the general ledger. Also at the end of each month the total of material as shown in Fig. 2 is vouchered in the same manner. In this way every item of material and labor is charged to its proper account.

As fast as orders are completed in the factory, the superintendent's order card is returned to the cost department, which totals the amount of labor and material, as shown by the cost sheet Fig. 3, and to this adds the percentage of burden which the order must carry. As soon as the order sheet has been closed, its costs are entered on the recapitulation of factory output for the month Fig. 6. Manufactured stock is charged with the total cost of the order and each department is credited with the record of its orders by material and labor and burden.

Fig. 7 is the storekeeper's copy of the shipping order which is used as a requisition for the delivery of finished goods to the shipping clerk who is to send them out on orders. When the shipping department receives the goods, the storekeeper's copy is returned to the office for pricing. These requisitions are numbered consecutively in the same manner as the requisition for materials and at the end of each month all that represent goods which have been shipped must be accounted for. In this way no possibility

Dept. A Recapitulation of Job Tickets for Week Ending Dec. 28 1912.

Dept. No.	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		Total	Lost	Amount
	Mat.	Burden	Mat.	Burden	Mat.	Burden	Mat.	Burden	Mat.	Burden	Mat.	Burden	Tot. Tickets	Time	Paid
Forward															
1000	4 50	2 50	3 00	7 50	4 75	4 00	3 75		3 75		2 40	1 50	31 40		31 40
1		4 75		4 75		4 25		4 75		4 75		2 50	25 75		25 75
2	3 75	3 50	2 65		3 60		3 60		1 40	1 25	2 20		21 35	1 60	19 75

Fig. 5—The Departmental Weekly Recapitulation of Job Tickets

of error can exist in making the correct deductions from stock. After the prices of the requisitions have been extended, the totals are entered on the recapitulation of storehouse shipments for the month Fig. 8, being charged to the selling accounts at factory cost, according to the nature of the product and being credited either to purchased or manufactured stock. This sheet constitutes a record of all shipments which have left the factory in the month. Monthly sales are credited to the proper selling accounts and therefore the accounts show monthly profits.

A most important development of this system is contained in the monthly statement of manufacturing and

RECAPITULATION OF FACTORY OUTPUT FOR MONTH OF December 1912

Order No.	CHARGE: Sundries	CHARGE: Manufactured Stock	CREDIT: Dept. A, Man'f'g Material	CREDIT: Dept. A, Man'f'g Labor	CREDIT: Dept. A Burden	CREDIT: Dept. B, Man'f'g Material	CREDIT: Dept. B, Man'f'g Labor	CREDIT: Dept. B Burden	CREDIT: Dept. C, Man'f'g Material	CREDIT: Dept. C, Man'f'g Labor	CREDIT: Dept. C Burden	CREDIT: Dept. E Material	CREDIT: Dept. E Labor
Forward	Acct.												
2560		17566	12566	2500	2500								
2630		2218				500	1218	1000					
2631		10566	7566	1350	1350								
2722		4520							2816	1202	902		
Forward		127760	88122	16000	16000	500	1218	1000	2816	1202	902		

Fig. 6—The Monthly Recapitulation of Factory Output

STOREKEEPER'S REQUISITION

Order No. 8886 Customer's Order.....Order.....Date Jan. 1, 1913.
Ship to ....John Jones & Co..... Charge to....Same.....
.....Tracy,..... .....
.....Conn. ....
Wanted..... Mail Bill to.....
Ship Via....N.H.Railroad.....
Credit Sale to...S..... Office Order.....Invoice Date.....No.

Quantity Shipped	Quantity Ordered	ARTICLE	COST		Cr. Stock
6	6	2½" Special Valves B/P #6270	16	39	P
4	4	10 Ft. lengths 2½" Pipe	4	00	P
6	6	2" Special Burners B/P #6271	29	17	M
			49	56	

P 20.39
M 29.17
49.56

Storekeeper--Please deliver the above goods to Shipping Clerk

Delivered by	Received by	Deducted Stock Storekeeper	Stock Clerk	Charged
413	402	K	3611	10/1

Fig. 7—The Requisition for the Delivery of Finished Goods to the Shipping Clerk

burden accounts which is reproduced in Fig. 9. The horizontal columns contain the totals per month of each department. The vertical columns give the debit, credit and balance of productive labor and material and the manufacturing balance.

This monthly statement of manufacturing and burden account is an analysis of the total debits and credits to manufacturing and burden accounts. In the debit to productive labor column is charged the total of all labor performed on manufacturing orders for the current month. The credit to productive labor represents the total which has been closed out on costs during the month. The difference between the debit and the credit is the balance of productive labor represented in orders that have not been completed. The debits and credits to material are handled in the same manner. The total represented in the column headed "total month's burden" is the charge to that department of all burden items for the month.

To clear this total burden on the total amount of productive labor debited to the department, it would be necessary to use the percentage which is found by dividing the total of productive labor into the total charge to burden. In the case in point the result is 76.2 per cent. In this chart, the figures of which are entirely fictitious, it was necessary to assume for the month of January beginning the illustrative system that the amount of burden necessary to clear is 70 per cent., and, following this assumption, $441.08 has been closed out as a credit to burden, leaving a balance of unapplied burden of $519.17. In order to ascertain the percentage that would be required to clear this account, the burden share of the balance of productive labor in open orders, it is necessary to divide the balance of productive labor into the balance of burden, thus giving the desired percentage to clear, which is 82.3 per cent.

To find the average per cent. of burden to productive

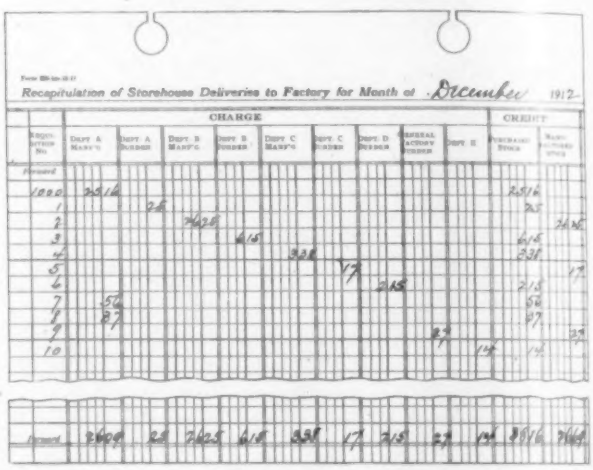


Fig. 8—The Monthly Recapitulation of Storehouse Shipments

labor for any given period, it is necessary to divide the total debits to productive labor of the several months into the total debits of burden for the same period. However, due to fluctuation in burden charges which occur from time to time the column headed "percentage to clear month's burden" may show a rambling set of percentages, but these are used only to show the relative comparison of total charges of labor to the total charges of burden for each individual month. If the percentages shown in the column of average percentage of burden to productive labor are used at the end of a given period, having made allowance for unapplied burden on labor in open orders, the burden account will be cleared. That is to say, there

Monthly Statement of Manufacturing and Burden Accounts

Month	Dept.	MANUFACTURING							BURDEN					
		Debit Prod. Labor	Credit Prod. Labor	Balance Prod. Labor	Debit Material	Credit Material	Balance Material	Ledger Manufacturing Balance	Total Month's Burden	Per Cent. to Clear Month's Burden	Credit to Burden	Ledger Burden Balance	Per Cent. to Clear Burden Acct.	Aver. Per Cent. Burden to Prod. Labor
January.....	A	1,260.22	630.10	630.12	7,225.63	4,260.15	2,965.48	3,595.60	960.25	76.2	441.08	519.17	82.3	76.2
February.....	A	1,022.14	745.16	907.10	6,372.75	3,892.12	5,466.11	6,373.21	1,022.30	100.0	804.19	647.28	71.3	86.8
March.....	A	1,475.34	1,025.62	1,356.82	12,627.38	7,527.20	10,546.29	11,903.11	990.88	67.1	1,025.62	612.54	45.1	79.6
April.....	A	1,390.76	980.70	1,766.88	10,745.65	6,390.17	14,901.77	16,668.65	1,140.26	81.9	686.49	1,066.31	60.3	79.9
January.....	B	720.16	425.18	294.98	1,272.96	1,005.02	267.94	562.92	722.01	100.2	425.18	296.83	100.6	100.2
February.....	B	640.92	510.17	425.73	1,527.33	1,122.01	673.26	1,098.99	750.22	117.0	561.18	485.87	114.1	108.1
March.....	B	836.27	489.26	771.74	1,092.45	975.78	789.93	1,561.67	689.31	82.2	342.48	832.70	107.8	98.3
April.....	B	760.19	650.17	881.76	1,127.52	1,017.33	900.12	1,781.88	675.26	88.8	650.17	857.79	97.2	95.9

Fig. 9—The Monthly Statement of Manufacturing and Burden Accounts from Which the Percentage of Burden to Productive Labor is Found

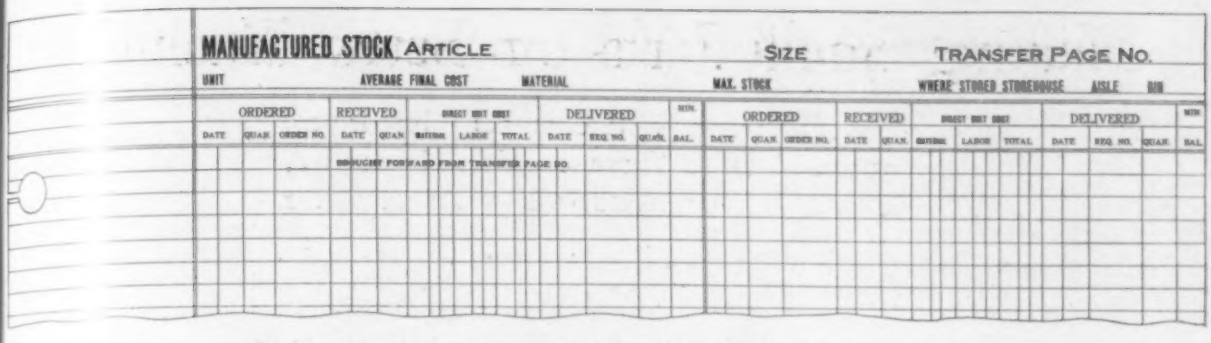


Fig. 10—A Sample Form Employed in Maintaining a Continuous Inventory

will be no balance of burden on the ledgers, excepting a sufficient amount to take care of labor in open orders.

Fig. 10 shows the stock sheets which are employed in keeping a running inventory of everything in the storehouses or stockroom, whether raw material or manufactured goods. It will be seen that this blank has a space for the name of the article and its size; the nature of the unit if it is a partly assembled product; the average final cost, which includes the burden; the nature of the material; the maximum stock which is carried, and the location in the storehouse. In the vertical columns are entered the date of ordering, the quantity and the order number, the quantity received and the date of receipt, the cost of material and labor, the date of delivery and the number of the requisition upon which delivery was made and the quantity delivered, and the balance on hand. At the top of the balance column is a space for entry of the minimum amount of stock which it is intended to carry.

The Southern Pig Iron Freight Rate Case

WASHINGTON, D. C., February 4.—The chief briefs in the case of the Sloss-Sheffield Steel & Iron Company and others against the Louisville & Nashville Railroad Company and others have been filed with the Interstate Commerce Commission by the complainants and defendants, and the case will be finally argued February 8.

This case involves the reasonableness of rates on pig iron from Southern producing points in Alabama and Tennessee to destinations on and north of the Ohio River, including the Buffalo-Pittsburgh zone; also the destinations in the Eastern States. The rates are challenged on the ground that they are intrinsically unreasonable and that they produce unjust discrimination as between commodities and as between localities. There are scores of complainants and intervenors in the case, and it is considered an important one.

The commission is asked to direct the railroads to restore the rates in effect from May 1, 1897, to February 6, 1899, from Southern producing points to the Ohio River and beyond, which represent a reduction of $1 a ton in the present rates. This would make the rates from Birmingham to Cincinnati, Evansville and Cairo, $2.25; to Louisville, $2; to St. Louis, $2.75; to Chicago, $3.35, and to other points in Central Freight Association territory and in the Buffalo-Pittsburgh zone the same as they were in 1897 to 1899.

On behalf of the Sloss-Sheffield Steel & Iron Company, William A. Wimbish, of Atlanta, Ga., sets forth that the increased freight rates on iron and its products were for a number of years in accordance with the increases in market prices, but that, notwithstanding the great decline in the prices of iron following the panic of 1907, no corresponding relief was granted by a reduction in the rates. The brief states that unless the commission gives relief it has been shown by the testimony taken in the case that "small tradesmen would become bankrupt; larger ones would lose their profits, and business generally would stagnate, as it has done in the past under depressions in the iron trade" in the producing points involved in the South. The brief summarizes the case of the complainants and intervenors as follows:

"Iron is entitled to the freest distribution that can be attained under the lowest rates consistent with a fair return to the carrier.

"The transportation charges operate to restrain the movement of Southern iron into Northern and Eastern territories to the extent to which it is entitled.

"The rates are excessive as compared with those formerly in effect.

"The rates are unreasonable in view of the cost and character of the service.

"The rates are unreasonable and discriminatory as compared with other traffic.

"The increased cost of railroad operation has been compensated for by increase in operating efficiency and in earnings of the carriers.

"The reduction asked for would work no injury to Northern producers of pig iron."

In addition to this, the brief asks the commission to grant to shippers reparation of excess charges in the event that it holds that the rates have been excessive.

W. L. C.

Flange Standardization Meeting.

A meeting on the standardization of flanges and flanged fittings is to be held in the rooms of the American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York City, at 2.30 p. m., February 21. It will be recalled that the committee of the society having this work in hand is enlarging the scope of the standard to cover larger size pipes and pipes subjected to heavier pressures than is the case at the present time. The new standards are to take care of the needs of water distribution at pressure, and among the associations interested in this subject is to be added the American Water Works Association. The meeting is for all interests, including the manufacturer. H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, New York, is the chairman of the committee.

American Chain Cable Works

Mention was made in *The Iron Age* in August last that the business of the J. B. Carr Company, Troy, N. Y., long known as the American Chain Cable Works, had passed into new hands. It was purchased by John H. Woodhouse, formerly of Trenton, N. J., and Clinton E. Hobbs of Boston, Mass. The plant has been thoroughly overhauled since then and is now in excellent condition, working a full force of men. Mr. Woodhouse is president and treasurer, and Mr. Hobbs is vice-president and secretary. The company makes a specialty of high grade hand-made chain in various sizes and diameters from ¼-in. to 4-in. stock diameter and is equipped for making crane, quarry and shipping chains of the highest quality. The business was established in 1865 by General Carr.

The Imperial Sewing Machine Company, 17 Madison square, east, New York, has purchased the manufacturing plant of R. H. Brown & Co., New Haven, Conn., taking possession February 1. The company will retain the present business of the firm and expects to begin immediately to manufacture all of its own special products. It is stated that the sewing machine which will be made at New Haven will thread itself, sew buttons on garments and do every kind of stitching, including the running stitch and chain stitch. This machine is the invention of the late Dr. Toof, who invented many sewing machine attachments now in use. The president of the Imperial Sewing Machine Company is Hiram Tyree.

Making Small Parts on Screw Machines

The Interesting Attachments Employed by the Felt & Tarrant Mfg. Company, Chicago, in Manufacturing the Comptometer

The Comptometer in general terms is a device for performing arithmetical problems mechanically entirely from a keyboard. Physically it is necessarily complex. In it addition, subtraction, multiplication and division may be done, and the machine, complete, is enclosed in a comparatively small case. Its manufacture involves the finishing of many small parts and an accuracy comparable with that of watch making. The manner in which the Felt & Tarrant Mfg. Company, Chicago, maker of the Comptometer, is handling some of the especially interesting details of manufacture is outlined in the accompanying illustrations and description.

A wide use in the works of the bench lathe and the micrometer suggests the general manufacturing methods for machining small parts accurately, and for finishing a number of the intricate parts of the Comptometer no method has been found more practicable. At the same time the advantages of manufacturing duplicate parts on special machines have not been overlooked, and various interesting automatic machine attachments have been devised with the result that the machining and handling time, and therefore the cost of many parts previously finished from blanks on the bench lathes, has been greatly reduced. In Fig. 1 a view of a part of the automatic screw machine department is shown, and the following illustrations show some of the products and the manner in which they are made.

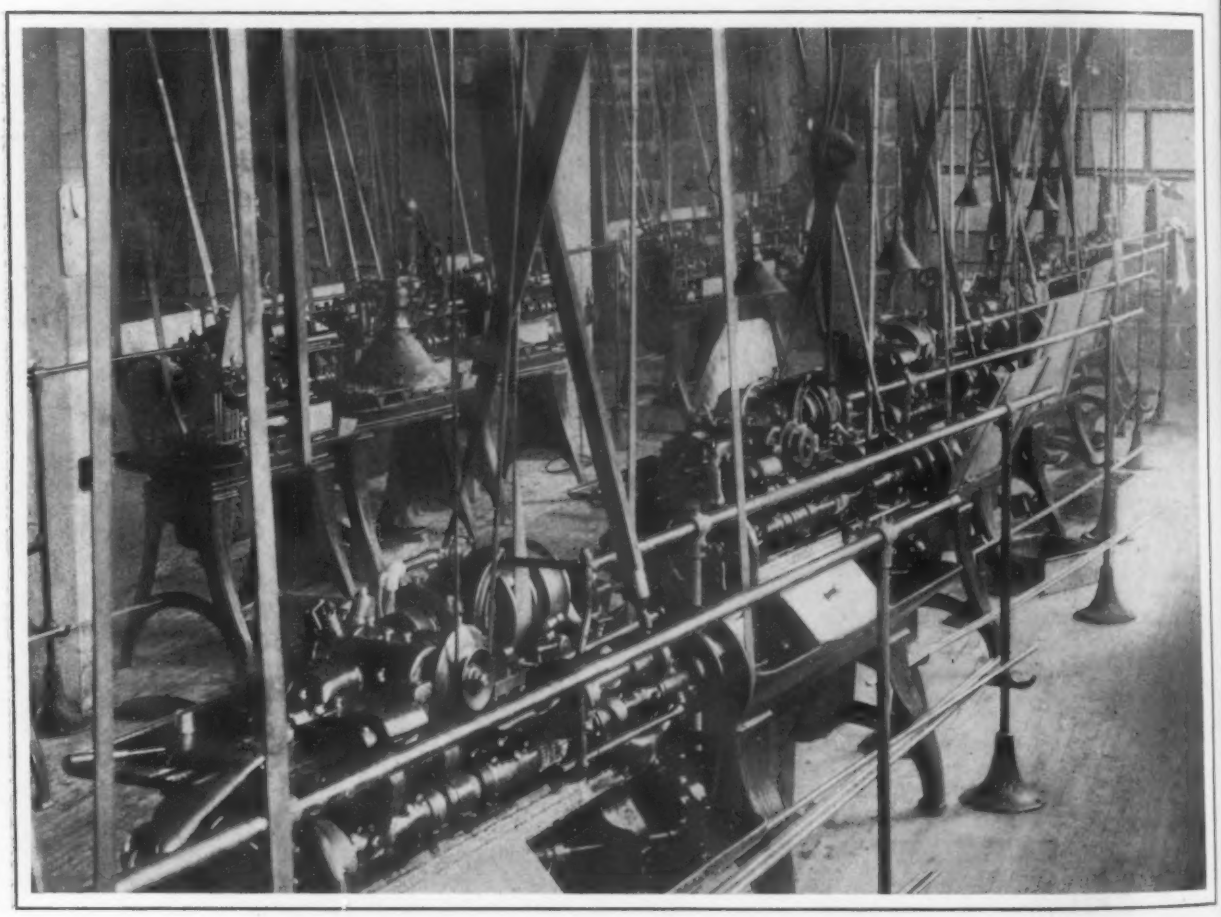


Fig. 1—Screw Machine Department Showing Framing and Supports for the Stock Built of Standard Pipe and Fittings

The piece shown in Fig. 2 is made on a No. 2 Brown & Sharpe automatic machine from ¾-in. open-hearth stock. The production time is 100 sec., and the screw-machine work is finished complete in eight operations and the set-up of the automatic is not unlike that shown in Fig. 10. After the stock is fed out to a stop the machine indexes and the breaking down tool moves in, cutting the slot between the two flanges and breaking down the stock in front of the flange. This tool then withdraws and the forming tool on the opposite side shapes up the piece to within 0.005 in. of the finished size. While the forming tool is still cutting, the stock is centered, then drilled and as the machine indexes, the breaking down tool cuts the slot between the flanges to the finished depth. While this slot is being finished the drill hole is reamed to size, a pilot box tool turns the larger diameter to finished size and is followed by a second box tool which finishes the smaller diameter and faces the end of the stock to finished size. The cutting off operation, which follows the withdrawal of the last box tool, is the only operating time in which at least two finishing operations are not in progress simultaneously.

A further operation on the piece involves the drilling of ten holes through both flanges, the holes being 0.092 in. in diameter. The multiple drill by means of which these ten holes in a circle of less than ½ in. diameter are simultaneously drilled is shown in Fig. 3.

The set-up of a No. 2 Brown & Sharpe machine on which the piece shown in the drawing of Fig. 4 is produced is illustrated in photographic part of Fig. 4. This piece, known as the odd key stop, is made from 7-16-in. acid open-hearth steel in a machining time of 60 sec. The stock is fed out to a stop and a roughing box tool turns the piece down to within 0.010 in. of the finished size and is followed by a finishing box tool which finishes the stock up to a shoulder. The spindle on the machine is then stopped automatically, preparatory to the particularly in-

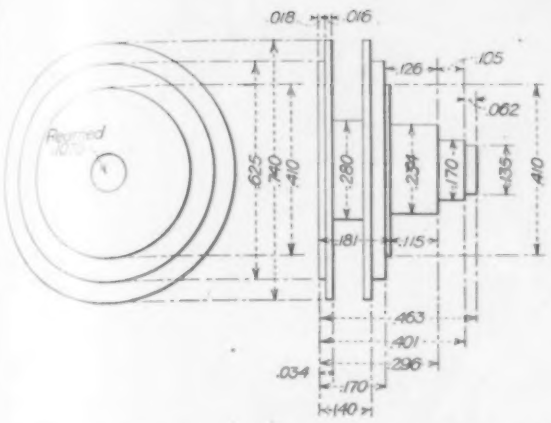


Fig. 2—Sketch of the Numeral Spacing Wheel Which Is Produced in 100 Secs.

teresting features of the entire operation, namely: the milling of the flat face. Instead of feeding the milling cutter into the work in a direction parallel to the axis of the stop and thus being forced to use a more rapid feed and at the same time take a cut through only a part of a revolution, an attachment has been devised which swings down into a horizontal position, as shown in the illustration, with the milling cutter arranged to feed against the stock at right angles to its axis. The milling attachment moves forward until the cutter spindle comes flush with the pin shown in the illustration between the cutter and the forming tool. The end of the cutter spindle which is free to slide in its bearing is held against the above cam operated pin by spring tension and this pin feeds the end miller against the stock at the rate of 0.0025 in. per revolution. At the completion of the operation the milling attachment swings up and the turret indexes. The forming tool then finishes up the fillet in front and turns off the shoulder in back and the piece is cut off.

The drilling of the piece shown in Fig. 5, the set-up for which is also shown, is an unusually delicate operation. The piece is broken down, formed and centered before drilling, which operation is performed independently of any of the others. A No. 53 drill is used and the depth of the hole is ⅜ in. The temperature that would be developed prevents continuous drilling to the full depth and it is arranged so that the drill feeds into a depth of 3-16 in., withdraws and is cleaned and takes oil, then drills an additional ⅛ in., withdraws for oil and then completes the hole to finished depth. After reaming the piece is then finished to outside diameter with a box tool as shown in the view of the machine set-up.

In Fig. 7 is shown the set-up of an automatic machine upon which the piece shown is finished in 28 sec. The piece, designated as the segment brake-lever roller, is turned from ¼-in. open-hearth stock and is required to be finished all over, drilled, reamed and burred on both sides and the edges chamfered. The attachment for burring the piece on the reverse side is particularly interesting. The stock is fed out far enough so that in the cutting off of the preceding piece, the following piece can be broken down by the same tool, shaped for the purpose as shown in the drawing of Fig. 7. Following the breaking down the piece is drilled and reamed and finished to size with a pilot box tool. Simultaneously with the cutting off operation but slightly preceding it in completion, a chamfering tool bevels one corner of the preceding piece and one corner of following part.

The arm shown in the foreground of the tool set-up, which carries an adjustable chuck, swings down and chucks the piece as it is cut off. At the point shown it is returning and is just about to move against the stop which tightens up the chuck preparatory to the centering of the reverse side of the roller with the tool shown at the left. The arm then moves over against a second stop which releases the chuck and permits the finished piece to drop out. On the small drill an attachment will be noted which cleans, breaks off the chips as the drill moves into the work, and cleans the drill as fast as it is withdrawn, the shield being held against the piece by tension of the long helical spring.

The group of four small end millers shown in Fig. 6 is the interesting feature of the equipment for finishing the ratchet pinion, a drawing of which is also shown. The face of this pinion is finished with four projecting posts which are milled from a continuous ring of metal extending around the periphery. Formerly this operation was performed on a drill, the piece being indexed four times for the four successive facings. The entire piece is now finished in 60 sec. from the rough and the milling operation requires but 7 sec. After feeding the stock out to a stop, the forming tool outlines the piece. It is then centered, drilled and reamed and finished with a box tool, which recesses the face of the flange, forming the continuous ring of metal which is subsequently milled out by the four millers, spaced to leave the four posts. The piece is finished for outside diameter with the box tool and is cut off.

In connection with the development of the attachments for the automatic machines, the practice of this company is interesting in several particulars. The forming tools instead of being made solid are built up in sections. This not only makes possible some forms which could not be worked out of the solid steel but prevents the loss of an entire tool following the development of some defect in process of manufacture. The tool can also be accommodated to changes in the form of the piece to be machined by the substitution of one section of the tool instead of requiring the making of a new tool complete. The operating cams are made of cast iron and are hardened after being formed in a solution of red sulphide of arsenic and sulphuric acid. The use of cast iron makes it possible to approach the finished cam shape by casting only portions of a complete circle where that is advantageous. In making up the cam considerable time is also saved as cast-iron drills clean and there are no burrs to be removed when the drill emerges from the metal. An interesting form of thread cutting die holder has also been adopted in this shop. Instead of the die being chucked into the holder

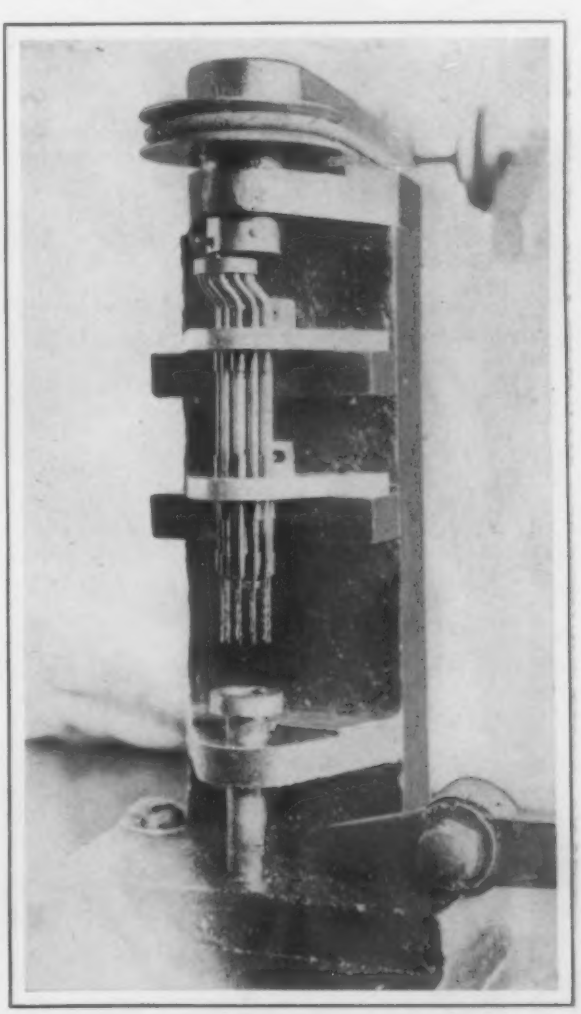


Fig. 3—Small Multiple Drill in Which an Eccentric and Crank Offset Drive Makes Possible the Drilling of Ten Holes at Remarkably Close Centers

S. DIESCHER & SONS,
Mechanical and Civil Engineers,

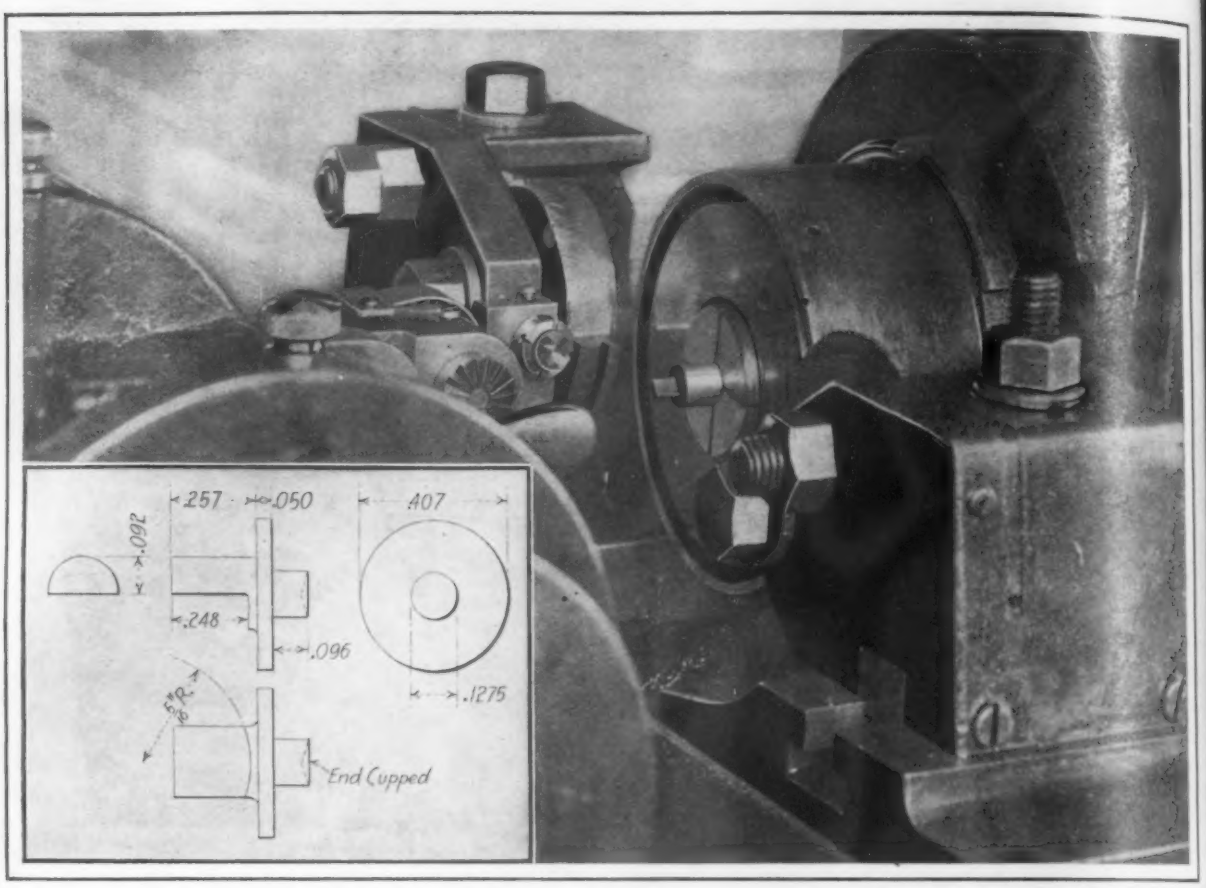


Fig. 4—Milling Attachment for Finishing at Right Angles to the Spindle the Part Shown in Drawing

and being centered by means of set screws, the holder is made with a loose cover which permits the die to float on the piece and center itself, when the cover may be clamped down upon the die, securing it by the tightening of two cap bolts.

The Comptometer comprises in its operating mechan-

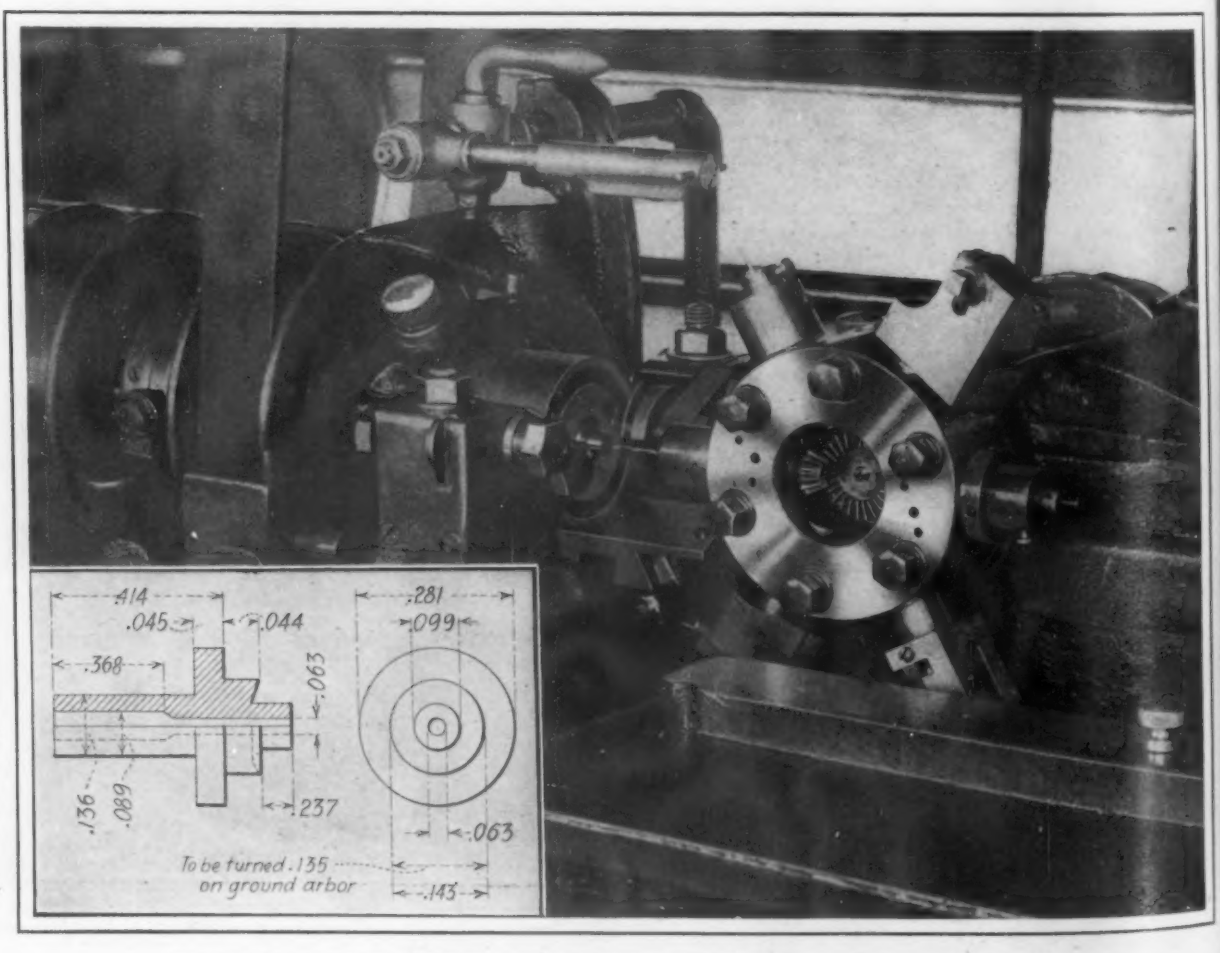


Fig. 5—A Small Piece the Drilling of Which Requires a Special Arrangement to Provide for Oiling

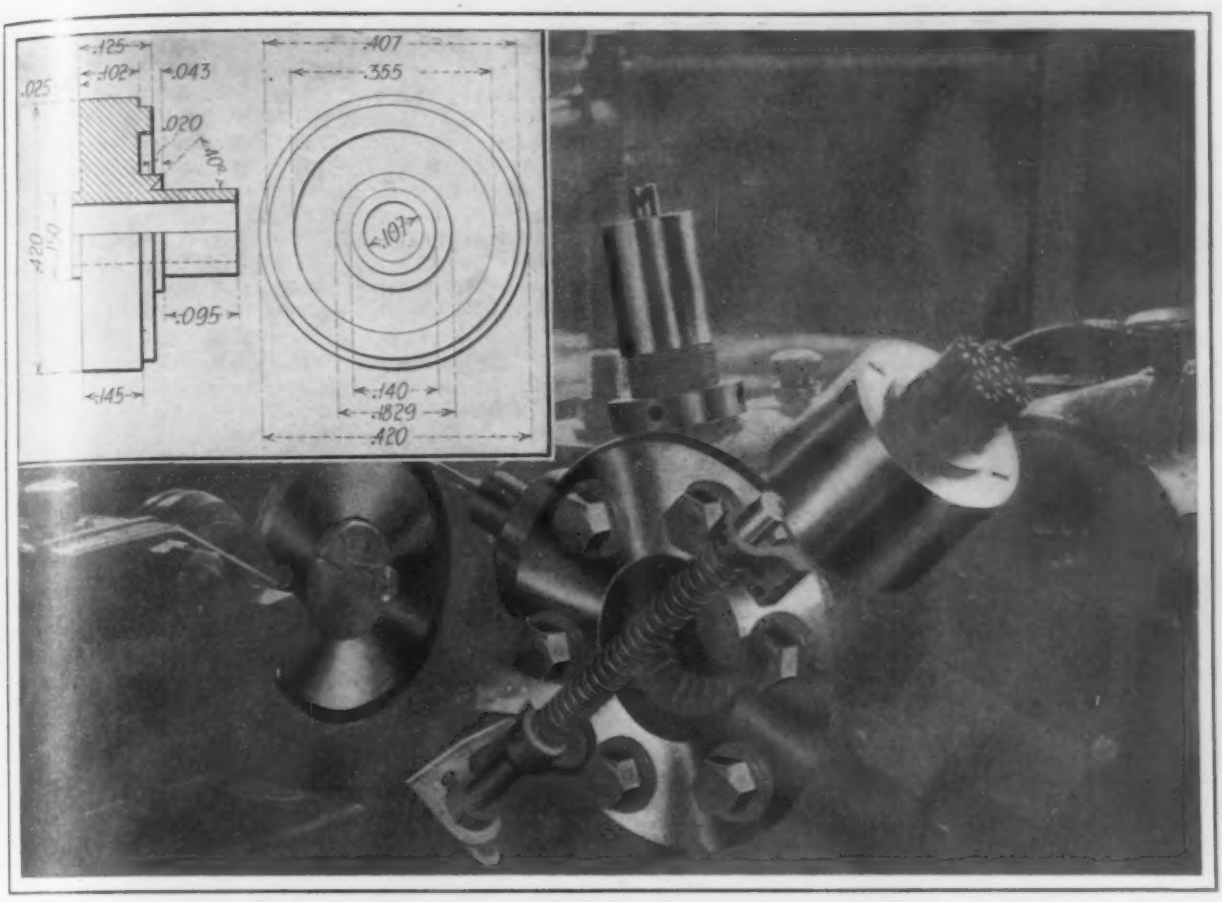


Fig. 6—Group of Four Small End Millers for Finishing the Ratchet Pinion Shown in the Drawing

ism a number of intricate stampings, the character of which is illustrated in Fig. 8. An unusual degree of accuracy is maintained in the forming of these parts and each piece is tested in gauges which multiply the faults several times. A complete set of parts for the Comptometer is maintained as a standard and in the making of

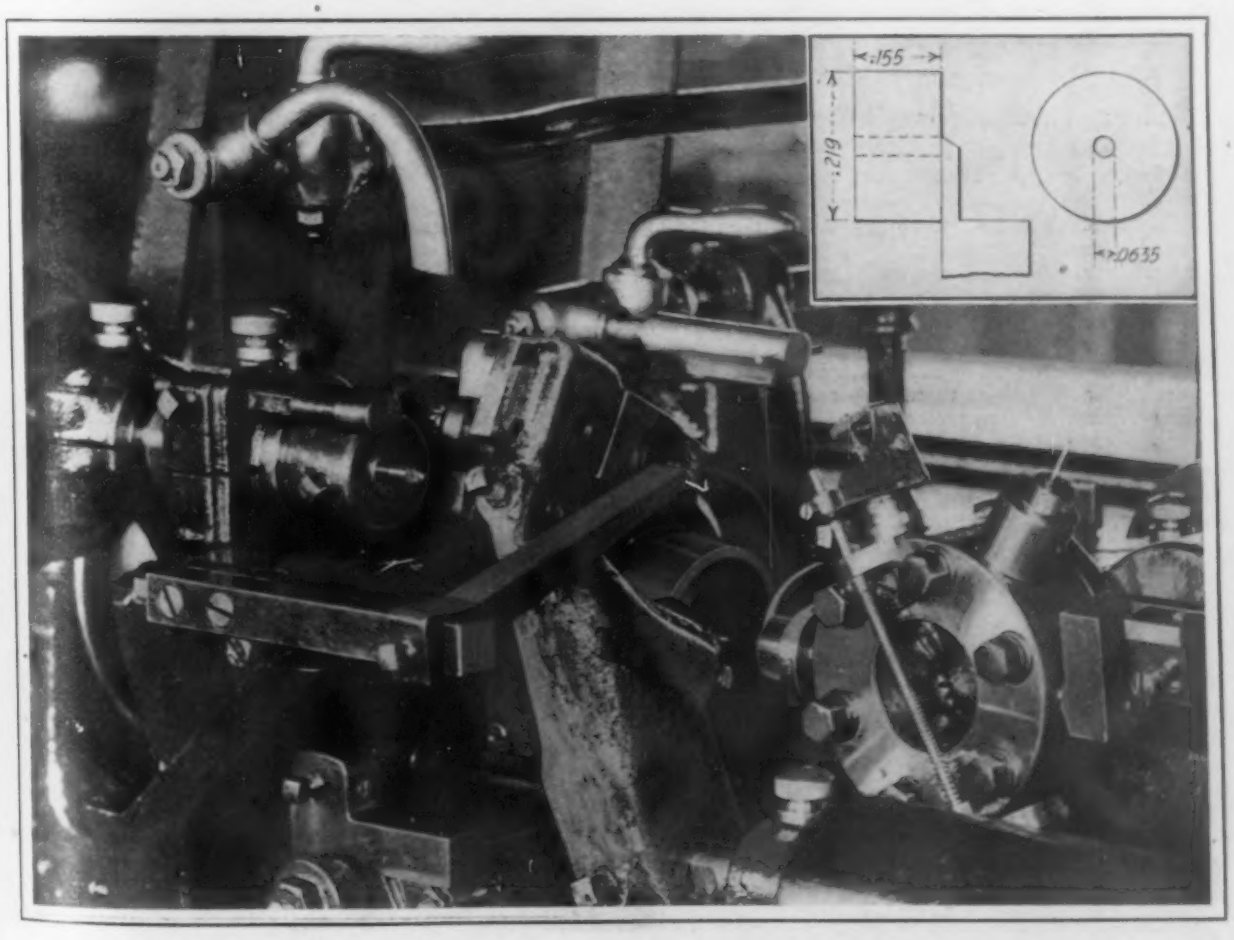


Fig. 7—A Small Roller Which Is Machined on Front and Back Faces Consecutively; Drawing Shows Cutting Off Tool

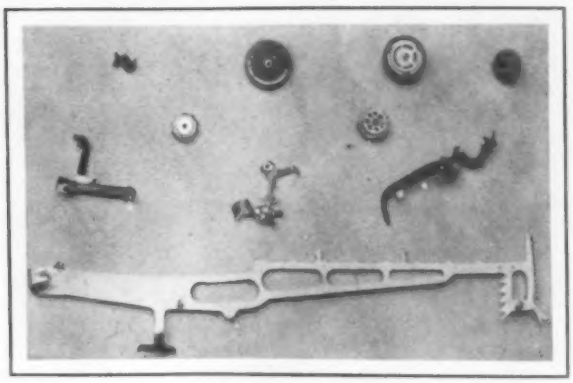


Fig. 8—Some of the Stampings Used in the Comptometer

gauges the master gauge is duplicated with a set for the use of inspectors and a set for the use of the operators testing the parts. The dangers attending on the handling of some of the small stampings in the presses are offset by a limitation of the rate of production. This is done by arranging the presses so that the operator must release the foot treadle between each stroke, and only on such work as can be handled in strips is the operation of the press continuous. The operators are also required to handle the smaller stampings with forceps. In some of the larger and more intricate pieces where removal from the die after stamping may spring the piece, the die is arranged with a pry which can be operated from a treadle raising the stamping clear of the die.

The frame of the Comptometer is assembled in the press shown in Fig. 9. This illustration also shows the manner of handling small parts in trays. In connection with the general assembly, a schedule in permanent form is prepared on which each individual part is shown by name and number, with its weight per hundred or other convenient quantity for weighing in and out of stock. The individual parts are arranged on this schedule in groups corresponding to the part assemblies into which they enter. There is one operator for each one of these part assemblies and one operator for the general assembly of the entire machine.

National Tube Company's Book of Standards

The 1913 edition of its Book of Standards is ready for distribution by the National Tube Company, Pittsburgh, Pa. The new edition, which is the first since the 1902 edition, is much larger and more complete than the older one. It contains 559 pages, 4 x 6½ in., and is printed on Canterbury Bible paper, the book, including the binding, being not quite ⅝ in. thick and will fit the pocket readily. The information incorporated has made it strictly a pipe handbook, and as such it is believed that it will find wide use with the trade. The index will be found very complete, all headings being thoroughly cross indexed. There are approximately 4000 references.

Several pages are devoted to a descriptive article covering the main process of manufacturing both welded and seamless tubes, also giving information in regard to the threading, durability and physical properties, etc., of both National pipe and Shelby seamless steel tubes. A number of pages give weights, dimensions, threads per inch, test pressures, sections of joints, specifications, etc., of the various kinds of pipes and tubings made. An article on protective coating, Matheson joint pipe, and Converse joint pipe contains desirable information on these subjects. Tubular electric line poles receive considerable attention. Several pages describe, illustrate and contain tables in regard to lapweld and seamless tubes, upset and expanded, wrought pipe bends, butted and strapped joints, bump joints, valves and fittings, including various kinds of nipples and flanges, hand railings and ladders, working barrels, cylinders, Shelby seamless specialties, Shelby seamless cold-drawn trolley poles, tables of various physical properties of Shelby seamless steel tubes, physical properties of carbonic acid gas, Briggs' standard, holding power of boiler tubes and thermal expansion of iron and steel tubes. Considerable prominence is given to articles on strength of tubes and cylinders under internal fluid pressure and collapsing pressures.

An article covering pipe used as columns is given, tables being supplied showing the use of standard, extra strong, and double extra strong pipe based on the New York building code as well as the Chicago building ordinances. Considerable attention is given to the mechanical properties of solid and tubular beams, of usual and unusual shapes. As tubing is finding considerable usage in the mechanical field, notably in automobile construction, such data are particularly useful. Chapters are supplied giving information in regard to water, gas, steam and air. It has not been the intention to go very deeply into these various subjects, only in so far as they concern tubular products.

A large collection of tables in conjunction with explanatory articles is given, an idea of the extent of which can be secured from the following list: Fifth roots and fifth power; decimals of a foot for each 1/64 in.; decimals of an inch for each 1/64; wire and sheet metal gauges in approximate decimals of an inch; proportions of screw threads, nuts and bolt heads, with illustrated explanatory articles accompanied by tables showing dimensions of screw threads, nuts and bolts. Several pages give area and weight factors for tubes and pipes, by means of which it is readily possible to figure the area and weight of various kinds of tubing. A special table is shown by means of which it is possible to find directly the weights of nearly all sizes and thickness of steel tubing up to 36 in. in diameter. A table showing properties of tubes and round bars is given with an explanatory article. This table gives various physical properties, including circumference, area, weight, surface in square feet, volume, moment of inertia, radius of gyration, etc., for tubes and round bars up to and including 36 in.

The metric system is included with conversion methods for most of the more commonly used measures including temperatures. A glossary of terms used in the pipe and fittings trade will be found in the back of the book, and in many instances the meanings of many of the more or less well known words used in this trade are defined. The price of the book is $2 per copy.

A contract has been awarded by the Erie Railroad Company for the elevation of its tracks through Jamestown, N. Y., at a cost of a little over $600,000.

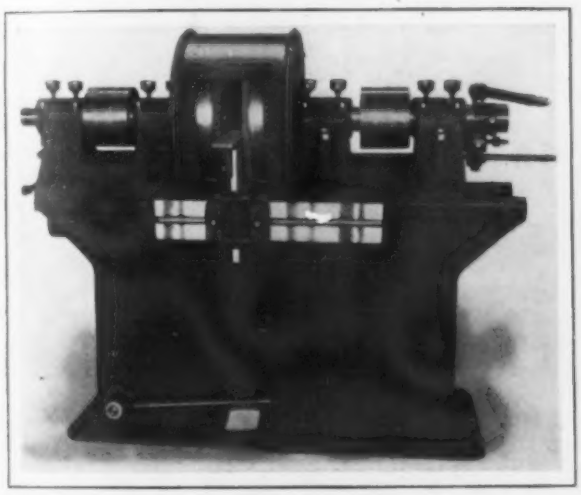
Fig. 9—Press for Assembling the Comptometer

A Double-Spindle Ring Wheel Grinding Machine

For the simultaneous grinding of two parallel sides of work, Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill., have brought out an improved double-spindle ring wheel grinding machine. This machine, which is designated by the builder as the No. 6 18-in. ring wheel grinding machine, was designed specially for a manufacturer of wrenches, and the construction is heavy and rigid, to give hard and continuous service.

The two heads are mounted on V ways planed on the bed casting, and the one at the left is bolted rigidly in position. The head at the right can be moved along the bed and clamped to grind any desired length within the capacity of the machine, while, in addition, the spindle of this head has an endwise movement of 1 in. to bring the grinding wheels in contact with the work. By limiting the longitudinal movement of this spindle it is pointed out that the grinding wheel on this spindle is always near to and rigidly supported by the head casting and at the same time there are no sliding surfaces working inside of the dust hood.

The spindles in this machine are heavy and the bearings are longer than usual for carrying vitrified grinding rings held in steel chucks. These spindles run in inserted bearing bushings, which are ground on the outside. The bushings, which are of cast iron lined with bearing metal, are split and fitted into bored and reamed holes in the head casting. Those on the right-hand spindle slide with it and completely incase it, thus reinforcing the spindle and protecting it from emery dust. The spindles are 2½ in. in diameter, and the total length of the bushings in which they turn is 37 in. The end thrust on each spindle is taken between the pulley and the outer bearing bushing on a hardened and ground tool steel thrust collar of larger area. An adjustable keyed collar of phosphor bronze held in place by a lock nut at the end of the spindle controls the end play. The spindle driving pulleys are 8 in. in diameter and a 6-in. belt runs over them. To bring the grinding wheels in contact with the work the spindle of the right-hand head has an endwise movement of 1 in. which is actuated by both hand and foot levers, operating through a pinion engaging a rack cut on the outer right-hand bearing bushing. This longitudinal movement is limited by an adjustable micrometer stop screw graduated to read to 0.001 in. so that work may be ground accurately to size and duplicated. The geared lever feed on the spindle provides a leverage of 20 to 1 so that the operator can force the machine to the limit of its driving power without undue muscular exertion.



The New No. 6 Double-Spindle Ring Wheel Grinding Machine Developed by Charles H. Besly & Co., Chicago, Ill.

The machine is equipped with an automatically telescoping dust hood, hinged at the back to give free access for changing grinding wheels, and has an airtight connection at the back of the machine for exhausting the grindings. The ring wheel chucks are of a suitable size for vitrified ring wheels having an outside diameter of 18 in. These chucks are made from pressed steel, with provision for setting out the grinding rings as the grinding face wears away. An illustrated description of this chuck appeared in *The Iron Age*, July 20, 1911. One of the special features of these chucks is that the construction is such that by means of a small handhole at the end of each telescoping dust hood the grinding may be set out and reclamped without removing the ring wheel chuck from the spindle. If desired, these chucks can be removed and disk wheels 20 in. in diameter substituted. When this is done the maximum opening is increased from 9 to 14 in.

The spindle and thrust bearings are lubricated from compression cups, and oil grooves are so placed that the lubricant is forced positively where it is needed. The movement of the lubricant is always in an outward direction, which, it is emphasized, prevents grit from entering and cutting the bearings.

The regular equipment of this machine includes 10 work rests, ranging in width from ¼ in. to 6 in. The hight of the machine from the floor to the center of the spindle is 40 in. The floor space required measures 24 x 58 in. and the dimensions of the bed casting under the heads is 14 x 64 in.

The complete weight of the machine when equipped with two 18-in. pressed steel ring wheel chucks, grinding rings and countershaft is 3500 lb., and when a cementing press and four 20-in. steel disk wheels are substituted for the ring wheel chucks the total weight is increased 600 lb.

Dodge Pulleys without Set Screws

The Dodge Mfg. Company, Mishawaka, Ind., announces that the Dodge Standard iron split pulleys are now being made without set screws and with the bushings split ready to put on the shaft. Many tests under actual working conditions have demonstrated that the pulley is held fast to the shaft with absolute security by compression alone. The hub bolts are large in diameter and the clamping power is therefore very great. This makes set screws unnecessary, and as they are an element of danger, projecting as they do from the hub, they have been eliminated in the interest of safety and efficiency.

All bushings for Standard iron split pulleys will be split, clearance for clamping being provided and the halves of each bushing wired together bearing a tag showing the shaft size. Also, in the interest of safety, all regular made to order Dodge solid iron pulleys and iron center wood rim pulleys, rope sheaves, etc., are being fitted with headless set screws which are concealed below the surface of the hub.

American Salesmen in Germany

There are three courses open to an American firm, wishing to send out its salesmen to canvass the German Empire, says the Bulletin of the American Association of Commerce and Trade, Berlin, Germany, and they are as follows: 1—The firm may establish a branch in Prussia or some one of the other federal states of the empire. 2—It may organize a corporation under German laws. 3—The traveling salesman may secure registration of his name as agent. To accomplish the first, the consent of the Minister of the Interior must be obtained, and the firm registered. Such firm is liable to income tax, but the agent of such registered firm has all the rights of a traveling salesman, in possession of a commercial identification card (gewerbelegitimationskarte).

The Cleveland Employers' Association, Cleveland, Ohio, has effected a reorganization and changed its name to the Industrial Association of Cleveland. Its object is to aid in securing and maintaining industrial conditions which shall be just to and promote the welfare of all concerned, and it will assist in all proper ways the enactment of constructive legislation looking toward the scientific regulation of working conditions. C. O. Bartlett, C. O. Bartlett & Snow Company, is president of the association and Edward J. Hobday is secretary and general counsel.

Efforts are being made by the business men of Mansfield, Ohio, to secure the erection of a large sheet steel mill in that city. The matter is in the hands of a special committee of the Chamber of Commerce, of which E. B. Cappeller is chairman. It is planned to organize a company, with a capital stock of $500,000, to be known as the Mansfield Steel Company.

The Human Element in Industry*

Economies of Proper Attention to Shop Hygiene Through a Service Department —Approved Methods of Ventilation

BY WINTHROP TALBOT, M. D.†

The doctor, the lawyer and the merchant chief are all alike in one respect, that they have not much use for the point of view of the other fellow. "All the world is mad but thee and me, and times I wot weel thee art not ower sound i' the head." To a manager the point of view of a medical man might easily indicate lack of mental balance; for employees are—well—"help," "hands," men employed to do jobs: if they can do them, well and good; if not, get others.

To a physician, the attitude of the executive is a veritable puzzle; for in present methods of management of men he sees so clearly the appalling and needless economic waste that he is liable to interpret as neglect and indifference what is in reality merely an abyssmal lack of knowledge of the human mechanism.

Some Things Awry

Is not the physician fully justified in asking, "What sanity is there in management which neglects human bases for effective work?" Human beings require pure air, but are given foul gases to breathe. They need clean surroundings, but do their work amid dirt and disorder. They should have light; either semi-darkness or blinding glare is provided. Those who crave change in occupation are wont to have monotony. Nature demands one-third of the time for sleep, one-third for home and recreation, one-third for work. The hours for toil are 10, 12 or 14 a day, frequently even more, and not seldom seven days in the week. The safety of the commonwealth lies in sound physical growth of children; they begin labor too young, untrained and handicapped by physical neglect.

Contentment and industrial peace depend upon equitable division of profits; but over-capitalization and stock manipulation preclude equity and burden the worker.

Neglect of the Man Problem

Industrial management is mainly the management of men. Every manager is so close to his subject that he rarely recognizes it as a problem needing scientific study at all. He usually has had careful training in mechanics, physics and chemistry. He knows about machines, methods and materials. But he has seldom considered that the human mechanisms over which he has almost complete jurisdiction require even more exact knowledge than machines.

In all other branches of his work he realizes the necessity of technical knowledge; not so in handling men. It is true that there is a rude art of management learned chiefly from practical experience, but it is inconceivable that in a scientific age ignorance and lack of special training in a matter of so great economic importance should long continue.

Andrew Carnegie considers that all strikes start with poor foremanship; but the average foreman has no more knowledge of the mechanics of the human body than of the planets in space, and the word "psychology" means as little to him as the Greek lingo of a bootblack. With the sublime confidence of a child and without training or preparation he assumes cheerful control of his own and other mechanisms and proceeds to play with them on the track of life like toys in the nursery.

Judging from the standpoint of a student of human engineering and taking into consideration not only hygiene and sanitation, but those physical conditions in general which affect thought, interest, attention and concentration, we are confronted even in the best shops by evidences of appalling human waste, and in the poorer workshops, where the standard of mechanical efficiency is still low, by conditions oftentimes unspeakable.

"Industrial Service"

Whatever just methods are adopted in improving conditions of labor inure to the benefit of the industry and of the community and are not primarily for the welfare of individuals. They should be undertaken as good business and in a spirit of public service, not of private charity. It is difficult to conceive of any words more unconsciously hypocritical than the common expression, "We have done a great deal for our employees," when the fact is, rather, "We have done a great deal to make conditions favorable for profitable work."

This spirit of service—and it is truly service of the broadest type—should be recognized by a substitution of the words "industrial service" for "welfare work"; the former are more accurate and clear.

Training for Managers

The day will come soon, and perhaps is already at hand, when it will be considered essential for one holding a position of authority and responsibility in industry to be acquainted with laws and conditions affecting the human mechanism to the same degree that he is familiar with the theory and practice of accounting or mechanics. When that day comes we shall look back on present-day conditions of labor with the same feelings of pity for past ignorance and of pride in the progress made that the superintendent of an up-to-date shop, with its perfection of mechanical equipment, might feel in looking upon the antiquated methods of a hundred years ago, or as the executive of a complex cotton mill might have in regarding the Lancashire cottage loom of the early part of the last century.

Responsibility of the Executive

In the field of education we recognize that inattention, lack of concentration, poor work, untruthfulness, and even malicious mischief, in the main are results of bad air, indigestible food, poor teeth, improper clothing, insufficient sleep, and other similar causes of a physical or physiological nature, such as can be avoided or removed.

In studying industrial conditions one finds a striking similarity between the shop and the schoolroom. There are the same enforced attendance, the same discipline, the same conditions of insanitation, and the same lack of attention to physical conditions of comfort as well as of health. Instead of blaming the child for his obvious faults, it is generally the parent or teacher, the physician or school board that is to blame. Likewise in industry, instead of blaming the worker for his shortcomings, we should correct the low standards which impose upon him thoughtless, ignorant foremen and bad work conditions.

It has been my duty in an advisory capacity to study at the request of manufacturers the conditions of employment in their works and the causes of avoidable human waste, injury and friction in industry. This occupation has led me to visit in a professional capacity some of the most progressive plants in the country. In unprogressive works conditions, of course, are bad, but even in progressive plants difficult problems exist and must be solved, of which the following may be considered as typical:

The Problem of the Old Plant

Twenty years ago the owners of a small business took over an old factory, well built, but not intended especially for the work. The floors never have been thoroughly cleaned, though they have been swept regularly. Windows have no shades; weights are lacking, and consequently sashes cannot be raised. There are skylights which are capable of giving good ventilation, but they rarely are opened. Rooms once ample are now crowded with workers. Lavatories are old-fashioned and inadequate; there are no dressing rooms or conveniences for the comfort and well-being of the girls employed. These old buildings are still in use, but in addition the business is compelled to extend and can do so only by the erection of new buildings. The new buildings have been well constructed along modern lines. They have been occupied for a couple of

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†Editor Human Engineering, Cleveland, Ohio.

years, but the training and habits of foremen and operatives in the old dirty quarters were such that even in this short time the new buildings have tended to deteriorate rapidly, for the standard of care and cleanliness continues to be the low standard of times past.

Service or Economics Department

To meet present needs there must be special executive attention to working conditions, and there should be a special department to deal with the needs of complex human mechanisms—a Service Department or Department of Economics, the term economics being used for the factory in the same sense as in the home. The work of this department should include:

1. Employment.
2. Health.
3. Work conditions.
4. Technical training of operatives.
5. Thrift.

Much could be said on the organization of such a department, especially in the matter of employment. I venture to assert that no concern exists to-day which uses scientific methods in the employment of help, knows the capabilities, qualifications, needs and limitations of its working force or gives as much attention to the complex human mechanisms in its employ as it does to its relatively cheap machines and mechanical devices. If this statement be true it points the way to better management in industry and the awakening to larger opportunities on the part of executives.

The Labor Office should be the pivotal division of a Service Department. Effectively managed it should determine:

1. The statistical information necessary to the scientific study of vital problems in the plant.
2. The selection, adjustment and training of the employee.
3. The degree of needless waste in the payroll.
4. The mental attitude, interest and standards in the employment of newcomers and in change of job among those already at work.

It is the purpose of this paper to deal primarily with certain aspects of shop hygiene, therefore we must leave this important topic of employment without further discussion.

Shop Hygiene

In shop hygiene we should deal first with general conditions affecting all employed, such as ventilating, plumbing, heating, lavatories, cleanliness, dressing rooms, lighting and lunch rooms. Secondly, it should deal with special conditions affecting mainly the individual, such as drinking water, machinery guards, work clothing, medical and surgical treatment.

The neglect of shop hygiene is the most frequent direct and indirect cause of accident, injury, disease, discomfort, irritation and friction. One of the main divisions of shop hygiene is the prevention of accidents—the meaning of the word hygiene being the maintenance of health in any way, by the prevention or removal of all causes or irritation or injury. It is possible to do little more than summarize a few of the main points at issue, each one of which would need special elaboration and consideration under varied shop conditions.

The Comfort Factor

We should emphasize the intimate connection which exists between health and comfort. As disease means lack of ease, so one can picture health as no other than a condition of comfort. The knowledge of this has led those of us who have paid particular attention to working conditions of ventilation to realize the careful study that what I may term the "comfort factor" demands. The relation of temperature to moisture, and this in turn to air movement is the comfort factor, and comfort is not determined solely by the number of cubic feet of fresh air per second brought into the establishment.

It may be said, roughly, that the optimum of comfort in air conditions is a temperature of from 65 to 75 deg., accompanied by 50 per cent. to 60 per cent. of relative humidity, and a movement of air at the rate of from 2 to 5 ft. per minute. Air movement may be measured by the anemometer, an instrument for determining the velocity of air and sensitive even to slight drafts. The means employed for determining the relation of temperature to humidity is the sling psychrometer. This consists simply of a pair of wet and dry bulb thermometers, fastened together on a board or a strip of metal. The muslin cover of the wet bulb thermometer must be thoroughly wet by immersion in water, just before each observation. The instrument is then whirled around the hand at the rate of about 12 ft. a second. Unless the air is saturated with water vapor, the evaporation from the surface of the wet bulb thermometer will bring down the temperature indicated by the instrument below that shown by the dry bulb thermometer next to it, from which there is no evaporation. The drier the air, the more rapid the evaporation, and therefore the greater the difference between the readings of the two thermometers. If we know the readings of the wet and dry bulb thermometers, we may easily determine by tables the relative humidity of the air. The person who has charge of the comfort factor in the shop can learn in a short time how to use this little instrument, and then know exactly what he is talking about instead of guessing at conditions.

Ventilation

The basic principle of all ventilation is not merely that a certain amount of fresh air shall be brought into a room and the bad air expelled, but also that the air shall be brought into the room in such a fashion as to produce a steady movement of air in every part of a room where human beings happen to be or go. In other words, it is insufficient to have merely an intake of air at one point of a room and an opening for air to pass out at another. This method of so-called ventilation is almost universal, and produces good results only in that part of the room which lies between the intake and the outlet of the air, but many other parts of the room will be as slightly affected as a back eddy of a river is affected by the moving current. Dead water of a stream has its parallel in dead air spaces of a room. Therefore, in the ventilation of work rooms it is necessary to establish a thorough-going cross circulation of air. This may be done inexpensively and well, if only there are windows on each side which can be opened, especially at the top; and in all factory ventilation this feature should be considered essential. If, in addition, there can be ventilating windows in the middle of the ceiling, running lengthwise of the room, as in a monitor roof, perfect ventilation of any room can be established often without the use of costly mechanisms and ventilating devices. Especially is this true in offices where heat is employed, or in glass working rooms.

Good air is a test of good workmanship. If an office is so arranged as to be stuffy or smelly, poor work and ill temper, indolence and carelessness may be looked for, with a good chance of their being found. Even carefully constructed buildings of the latest model architecturally are often arranged so that offices are insufficiently supplied with fresh air. It seems strange that men of intelligence and alertness in matters pertaining to dollars and cents, and versed in methods of control and management, accustomed to study all conditions affecting profit and loss, should be thoughtless and often ignorant concerning the quality and nature of the air by which their thoughts and actions are directly influenced.

Men complain of poor health, of a tendency to take cold, to have headaches, to suffer from indigestion, lapses of memory, inattention, impaired power of concentration, when nothing in the world is the matter with them except that they are staying most of the day in a cooped up office, breahing over and over again the fragrant incense emanating from their own bodies and their friends' cigars.

I leave it to the reader as a matter simply of common sense, whether he can do his work as well in a stuffy, ill-smelling, uncomfortable room, as he can where the air is fresh and pure, and with the right degree of moisture and heat. If anyone opens a window, however, in the hope of making conditions a little more bearable, there is a growl, and some one exclaims: "What a draught" But any office can have good atmosphere by providing for a flow of air through the room. Gases, even more than fluids, intermingle freely, and by giving a chance for warm air to escape at the top of the room, cooler air will enter from below if an opening exists. Foul air gathers mainly in the warmer strata. This is no scientific theory, but it can be proved by anybody in any warm room by taking the trouble to place a chair on a table and then stand on

the chair. You can compare for yourself the quality of the air in the top of the room with the air in the lower layers. The air in the upper layers is particularly bad if many people are working in the office or anyone is smoking. Draughts consist of cleancut currents of air, and no one likes them, but everyone feels more comfortable if the body odors which every human being gives off are swept away by steady air currents.

The chief economic objection to the use of mezzanine floors, galleries, and balconies for clerical and other workers lies in the fact that the hot, bad air rises to them, carrying foulness which will produce inattention, lack of concentration and consequently slow, inaccurate work, besides tending to breed disease.

In the first place, then, it is necessary to arrange our windows so that air can come from outside near the level of the face, and make its exit at the top of the room. In nine hundred and ninety-nine windows out of a thousand the shades are so arranged that they cannot be in use and yet allow air to pass through the top of the window. In other words, the shade is hung at the top of the window frame and drawn down over that part of the window where it is least needed. The lighting of a room in any event should be from the upper part of the window and nothing should obstruct free ventilation when the upper sash is lowered.

The Hygienic Window

The author does not claim that the following method of office ventilation is necessarily inspired, ultra-excellent and beyond improvement, but it is effective and generally applicable. The illustrations show clearly the method adopted.

In the first place the shades are hung in the center of the window frame, so as to work from the center towards the top and to the bottom, two shades being provided for each window. This permits of absolute control of the lighting of the room, especially from the upper part of the window, where most needed, and for opening the window at top or bottom without cutting off circulation of air or wearing to a frazzle either the shades themselves or the temper of the worker by their constant flapping. The method of fixing these shades is given in such detail in the drawings that it needs little in the way of verbal description. The automatic catch pulley at the top of the window holds the upper shade at any desired point.

The next important device is a screen to fit the window frame outside the upper sash, made 22 in. wide, of wood and fine copper mesh, 50 or 60 wires to an inch. This will allow air to filter in without draughts, except in winter, when it should be reinforced with a piece of white cotton cloth, or a light green or yellow lawn cheap or China washable silk can be provided, where color tone is desired.

When a moderate breeze is blowing, if a candle be placed within a yard of this screen the flame will not be cut. In cold weather, when there is a decided difference in temperature indoors and out the wire must be reinforced by the cloth; in summer not.

A third device should be a piece of plate glass, wood, or even Bristol board, held in grooves at each end of the lower part of the window, permitting the air to enter at the level of the face. There should be a wire screen also for the lower part of the window. This may be permanent or not, according to preference. To repeat:

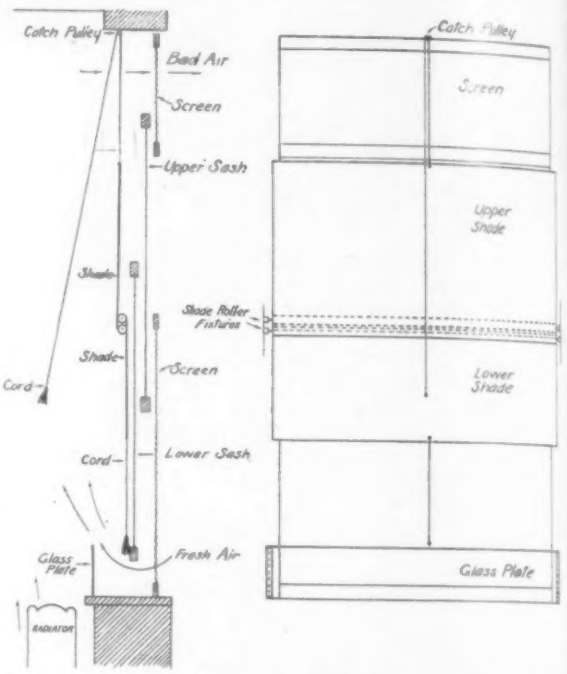


Fig. 3—Arrangement of Fixtures, Shades and Screens for Hygienic Window

1. Each windown should be supplied with two shades drawing from the middle of the frame up to the top and down to the bottom.

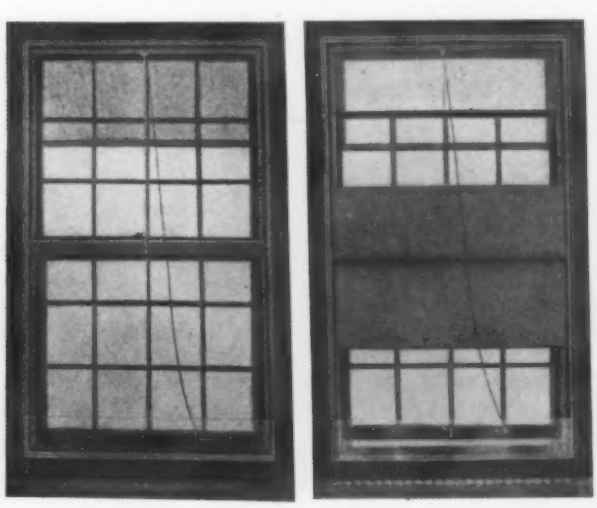
2. Fine wire mesh screen for the top of the window.

3. A piece of plate glass or board across the lower part of the window.

4. A screen for the lower sash.

Perfect ventilation can be obtained by raising the sash from the bottom slightly, when the piece of plate glass will act as a deflector; cooler air will be blown in and upward to the top of the room, whence it has a tendency to settle. With the window at the top open, heat will not be rapidly lost, if the screen is arranged so that there is between the wire and the cloth a layer of air which permits free passage of air, but acts as a non-conducting layer for the minimum transmission of heat.

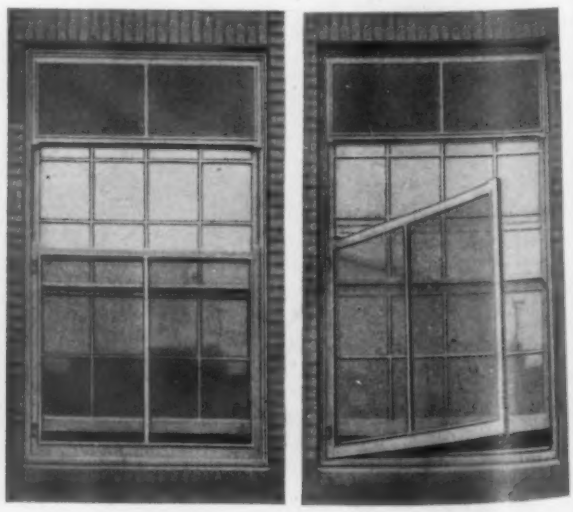
The small cost of this outfit will be repaid scores of



Both Shades Rolled Up in Center. Windows Closed

Upper Shade Raised. Lower Shade Lowered. Window Open for Ventilation Without Draft

Fig. 1—Inside Views



Screens in Position

Lower Screen Swung Open on Hinges to Allow Window Cleaning

Fig. 2—Outside Views

times each year by increase of capacity for work, and the allaying of that irritation which comes from air starvation.

Mechanical Ventilating Devices

It is not needful here to discuss the pros and cons of special and patented methods of ventilation. This is a subject largely complicated by the financial interests involved in the manufacture of apparatus. For general ventilation simple methods like those suggested above are the best. They include the use of exhaust fans. Electric fans to induce air motion are practical means of producing conditions of comfort under ordinary circumstances.

An otherwise well ordered concern in the middle West had a strike on its hands last summer simply because of intolerable heat conditions in its foundry. In the present age the men were amply justified in refusing to work under such conditions. Standards that might have been tolerated several decades ago are out of date to-day.

Dust and Draughts

In all workrooms free openings of the windows, especially at the top, is desirable; nevertheless under most conditions there is much dust in the outside air at times, and in many rooms draughts may make work difficult and unproductive. For these reasons also the windows of workrooms should be provided with the fine wire mash screens, varying in fineness from 40 to 60 mesh, which is the standard for dust protection. These will be sufficient under almost all conditions to exclude dust, and will prevent drafts as well.

Where there are flames or fires 40-mesh copper screens covering one-half or one-third of the opening of the upper sash, and attached to the outer window frames, and a 60-mesh attached to the lower frame will prevent gas flames from being cut. In winter, when the outside air is much colder, a second screen of copper or cloth is necessary if drafts are to be prevented, and it becomes desirable to retain more heat.

Electric rotary fans, used for exhausting air, are the best mechanical means of changing the air in a room. In most cases better results in ventilating by means of rotary fans will be obtained by placing them not at the sides or ends of the building, but in the roof, or at the mouths of ventilators leading to the roof. For instance, if a building faces the west and a rotary fan be placed in the west wall, and if the prevailing wind be a northwest wind, it blows directly against the current of air thrown out from the building by the fan, and the work of the fan is counterbalanced and made useless by the continued pressure of the wind on the outside. This may be met by erecting a pipe or sheet iron leading upward on the outside of the building.

Roof ventilation also should be adopted in every case when possible. Some ventilators are of a type which is singularly ineffective. Experiments with anemometers show that on warm days there if often a downward draft through these ventilators which are supposed to carry away the warm air from within the building. Effective ventilators, however, are on the market.

In cases where windows cannot be opened and shut freely at the top, bad ventilation exists as a rule. Bad air is chiefly hot air, and hot air rises.

Measures should be taken to see that window frames and sashes be put in such order that they can be used freely; also that in no case should boxes or frames be piled in such a way as to obstruct free access to the windows.

Vapors, Fumes and Odors

It is inefficient simply to supply fresh air and to remove foul air from the workrooms of the factory. In addition there should be as little artificial contamination of the air as possible. In any case where there are numbers of workers engaged in strenuous or continued occupations, the emanations from human bodies will make air unfit for breathing. The air becomes doubly enervating then, and is bound to affect the quality and amount of output unfavorably and wastefully.

Vapors and organic odors, such as the carbonizing of oil, and odors from the bodies of workers demand not only the consideration of comfort but are factors in causing poor health and disease, and I make a distinction between poor health or lowered vitality and actual disease processes. There are few dust-producing processes which cannot be cared for by exhaust fans, and I would call attention to the study of the use of exhaust fans made through a Parliamentary Committee in England* three years ago, the most satisfactory study of this subject of which I am at present aware. All organic odors, such as tobacco smoke, the fumes of wood alcohol, varnish, paint, lubricating oil and odors from the human body (probably from essential oils), can be overcome by the use of ozone apparatus. The free oxygen molecule of the ozone combines rapidly to oxidize these organic odors and render them imperceptible. An ozone machine can be run easily by the current from an ordinary socket lamp. It does away with disagreeable odors in a marvelous fashion. Care should be taken in selecting the apparatus for the production of ozone to choose a type which does not produce poisonous nitrous compounds. The mechanism of most ozone machines is open to criticism on this ground.

Working under bad air conditions fosters inattention, inaccuracy, neglect; yes, one may say, the workman is forced into those faults by the physical conditions under which he works, yet is blamed, and indirectly because of them loses his job.

There are persons, to be sure, who are not readily affected by bad air, just as there are people who are not sensitive to sound and whose vision is not acute. Such men are often capable of turning out a fair grade of work, especially of a rough sort; yet it is safe to assume that no human being exists who cannot do better work under good conditions of ventilation.

(To be concluded.)

Water Shipments of Plumbing Goods to Pacific Coast

The Standard Sanitary Mfg. Company, Pittsburgh, has made several important shipments of plumbing goods from Philadelphia to San Francisco, around South America through the Straits of Magellan. This represents a distance of about 15,000 miles. The most important of these shipments, consisting of 4151 bath tubs, 6800 lavatories, 700 laundry trays, 162 miscellaneous fixtures and 22 boxes of brass work, with a total weight of considerably more than 2,000,000 lb., was shipped by the American four-mast clipper Erskine M. Phelps, which sailed from Philadelphia August 17 last, and reached San Francisco December 28, after a voyage of 133 days. Part of the shipment originally intended for this boat was shut out for lack of space, and was forwarded July 31 by steamer Windber, which reached San Francisco October 28, being on the water 89 days. Later shipments, via the same route, were made by sailing vessels, the Magna Reva and John Ena, and are still on the sea. The total number of fixtures in the above shipments was 10,423 bath tubs, 18,827 lavatories, 229 miscellaneous fixtures and 22 boxes of brass goods. The total number of carloads was 183 and the total weight more than 4,000,000 lb.

At a meeting of the stockholders of the General Fire Proofing Company, Youngstown, Ohio, held last week it was voted to resume the payment of dividends and to issue a new series of preferred stock to the amount of $100,000. The company reports having had a very prosperous year. Officers were re-elected as follows: Chairman of the board of directors, M. I. Arms; president, W. H. Foster; vice-presidents, A. P. White and J. T. Harrington; secretary and treasurer, F. K. Rhines. The directors are: M. I. Arms, A. P. White, W. H. Foster, C. H. Booth, J. T. Harrington, W. P. Arms and Henry Wick.

The Firth-Sterling Steel Company, McKeesport, Pa., for which E. S. Jackman & Co., are sales agents, has issued a brochure entitled "The Relation of Tool Steel Prices to Manufacturing Costs." Its 12 pages are filled with examples of the reduction in cost of work done with the use of the company's Blue Chip steel as compared with the results produced using steel of considerably less initial cost. The claim is made that if one steel does 5 per cent. more work than another it is well worth 50 per cent. more per pound on all usual operations.

*Report of Departmental Committee on Ventilation of Factories and Workshops, 1907. Darling & Son, Bacon street E., London, England.

Little Economies for the Machine Shop*

Use of Automatic Machines and Tool Holders; Establishing Fitting Allowances; Things the Machine Designer Should Consider

BY STUART DEAN

Generally speaking, there are few jobs that an automatic or semi-automatic machine will turn out faster than a standard type of machine, provided the standard type is as powerful as the semi-automatic in drive and has quick changes of speed and feed. In other words, the greatest advantage of the special machine is its power and quick changes of feed and speed.

Automatic Versus Standard Machines

A powerful, standard machine, provided with quick changes of speed and feed, will generally turn out work cheaper than an automatic or semi-automatic, because:

1. The average machine job, having few operations on it (it should be redesigned if this is not so), rarely brings the special features of the semi-automatic into play.

2. In general, the number of pieces to be run through are too few to pay to set the stops, etc.

3. The machines seldom are properly equipped, because each new job generally takes a complete outfit of special tools.

4. On account of these machines being more complicated than the average standard tools, often some one part is out of order, not badly enough to pay for overhauling, but enough to interfere with the running.

5. The price of such a machine is generally prohibitive. It is safe to say that in three cases out of four, expensive machines are run the same as common machines, thus getting no benefit from their special features.

Fitting Allowances

Make a table giving the allowable looseness of the different parts on the machine you manufacture. Some parts do not require a close fit. On these a saving will be made by not working too close. Accuracy, as a rule, cuts down speed and increases costs. Put this matter down in black and white, else the workmen will have no way of knowing what work is particular and what is not.

Wherever possible have each jig so made that it tests the accuracy of previous operations. Make the jig so that it will not fit the piece, or so that the piece will not go into the jig if the previous operations have been done inaccurately. This method discovers faults in workmanship immediately, without the expense of an inspector.

Number each jig and put these numbers on the drawings. This will insure the jigs' being used.

Three Machine Shop Suggestions

A boring bar guided close to the work will stop all chatter, and will allow an increase in output of about 30 per cent. over boring with a bar not so supported. The casting can be much out of true in the rough and not affect the speed of production. There will be no necessity for cutting down the speed or feed in taking the finishing cut. In fact, the feed on the finishing cut can be doubled and still make a smooth job. The boring can be done in two cuts instead of three. This is not possible when the bar is not so guided.

On duplicate work, where the tool need not be disturbed, put a clamp on the lathe to act as a stop for the cross slide. Accurate work can be turned out very rapidly by this method, as it eliminates calipering.

The planer type milling machine, with a number of cutter heads, reduces the milling cost on work having two or more faces to be machined, provided there is enough work to keep the machine continually busy.

Tool Holders

Use tool holders on all small and old machine tools. Probably 95 per cent. of the work done in a machine shop is light enough to be handled with tool holders instead of solid tools. They are great savers of tool steel and save even more in wages which must be paid out for forging and grinding solid tools. They keep the man at the machine.

A ¾-in. bar of square steel on a long continuous cut on rather hard cast iron, at 70 ft. per minute, a 1/9-in. feed, and a ⅛-in. depth of cut, will remove 11 cu. in. per minute. A stream of chips, literally red hot chips, will come off the tool point.

On soft cast iron, a good grade of ¾-in. square high-speed tool steel will run 110 ft. per minute, 1/9-in. feed, and a depth of cut of 11/64-in., removing at this rate 25 cu. in. per minute.

Thus there are few places where the full size forged tools are needed.

I know of a firm that uses ¾-in. steel with no tool holders. They place a piece under the bar of tool steel in the tool post of the lathe to bring the hight of the steel up to the correct point. This works very satisfactorily.

Any firm that uses a good grade of high speed steel in this way will have a smaller tool steel bill than in the days before high speed tool steel. The reason for this is that high speed steel is ground very little as compared to the carbon steels. This freedom from grinding is just as true of high-speed steel drills, especially the twisted types, as it is of cutters.

General Machine Specifications to Be Laid Down

The product of the designer must be an article that is readily salable as well as easily made. Certain general specifications will have to be kept in mind, which make a strong smooth-running easily operated machine. The more important points follow:

Have quick speed changes. Have quick feed changes. Speed steps should not be greater than 5 per cent. from one step to the next; that is, 2 to 3.

Have power pass through as few gears as possible from motor to work. No gear should run higher than 1000 ft. per minute tooth speed. Above this speed use belts or the silent chain. All gears must be protected. Worm gear drives should be avoided, as they wear rapidly and require excessive power. Machine tool makers, on some of their heavy machines, are cutting the gear teeth on an angle. This prevents chatter and the marking of the work by the gear teeth.

Make all sliding surfaces, such as ways, etc., of ample area to take care of thrust pressure and wear. Have lubrication well taken care of. On all high speed bearings use ring oilers.

Equip all feed screws, etc., with index dials graduated to 0.001 in. so that accurate movements can be made without calipering or measuring the work. In addition, duplicate cuts on different pieces can be taken without waste of time.

Make all bolt slots so that the depth of the narrow part is at least 30 per cent. greater than the width of the slot, to prevent the breaking of slots.

It is becoming the rule on lathes to design the spindle one-quarter the diameter of the lathe swing for machines

*Copyright, 1913, by Stuart Dean. Fourteenth article on Shop and Foundry Management. The thirteenth article, "Selecting the Correct Machine for the Work," was printed in the issue of January 23.

that take enormous cuts. The tail stock barrel is made one-sixth the swing of the lathe. The tailstock is locked down with plenty of heavy bolts.

In choosing the motor for a machine, a rough rule is to allow ½ hp. to remove 1 cu. in. per minute of cast iron, and 1 hp. 1 cu. in. per minute to cut steel. This estimate may be 50 per cent. in error either way, depending on the shape of the cut, the hardness of the metal and the loss of power in the gearing, bearings, etc.

The power lost in gearing is greater than is usually realized and for this reason slow speed motors are desirable. To remove 126 cu. in. of steel per minute in an engine lathe at a cutting speed of 28 ft. per minute 1½ in. deep cut, ¼ in. feed per revolution, using a single tool, 80 hp. is required. To reduce a bar 2¼ in. in diameter to 1 in., with 11⅜-in. feed per minute, or at the rate of 35 cu. in. per minute, in an engine lathe, requires 20 hp. About 92 hp. is required to remove 400 cu. in. of steel per minute on a milling machine.

Tool Pressure

The tool pressure on a lathe is 75 tons when removing 11 cu. in. per minute with a cut ⅜ in. deep, and 0.05-in. feed per revolution at 185 ft. per minute cutting speed. This is on mild steel having a tensile strength of 56,000 lb. and 44 per cent. elongation. The end thrust when drilling with a 3-in. drill, at 100 r.p.m. and 0.03-in. feed per revolution or 3 in. deep per minute, is about 5000 lb. Such work would require a 50 hp. motor on the machine.

California Metal Trades Association

The sixth annual meeting of the California Metal Trades Association was held in the assembly hall of the Merchants' Exchange Building, San Francisco, on the evening of January 22. The retiring president, Sam J. Eva, made a brief report, in which he told of the good work which had been accomplished by the association within the year just ended. He spoke optimistically and encouraged a continuation of the harmonious relations which have existed among the metal trades employers since the founding of the institution some six years ago.

Officers were elected for the ensuing year as follows:

President, O. H. Fischer, Oakand; first vice-president, Constant Meese; second vice-president, John A. McGregor. General executive committee, Sam J. Eva, W. H. French, Emeryville; James S. Hawkins, Oakland; John Hedley, S. S. Herrick, H. C. Macaulay, West Berkeley; R. H. Postlethwaite and P. H. Reardon. Advisory and conference committee, P. L. Bannan, G. A. DuBois, West Berkeley; Edward J. Fowler, James S. Hawkins, Oakland; William M. Jenkins, James W. Kerr, Constant Meese, R. H. Postlethwaite, J. M. Robinson and John T. Scott.

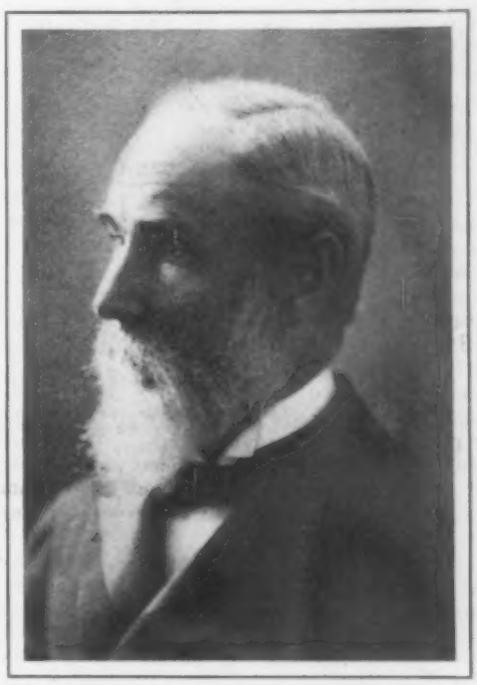
The Burden Sales Company, with general offices at 30 Church street, New York, and sales offices in Chicago, Atlanta and St. Paul, has been organized by Gilbert H. Pearsall, president; H. H. Linton, vice-president, and Craig Graves, secretary and treasurer, to be a distributer of the products of the Burden Iron Company, Troy, N. Y., exclusive of horse shoes. In connection with these general offices will be the Eastern sales office of the Jacobs-Shupert United States Firebox Company and the Oxweld Railroad Service Company. Notice of Mr. Pearsall's election to the vice-presidency of both these companies was announced some months ago.

The Stephens-Adamson Mfg. Company, Aurora, Ill., held its annual meeting last week and elected the following officers and directors: President, W. W. Stephens; first vice-president, D. B. Pierson; second vice-president, G. H. Stephens; secretary, Frank W. McWethy; treasurer, F. G. Adamson. The directors are the same as above, except the substitution of C. S. Kilbourne for G. H. Stephens, the latter being located in New York City as Eastern representative.

Death of Robert Sleeth

Robert Sleeth, vice-president Seaman-Sleeth Company, Pittsburgh, Pa., died in San Diego, Cal., January 24, aged 86 years. He was born in Ireland and came to this country with his parents when a child, the family settling in Pittsburgh. He learned his trade as a molder in Mitchell's Foundry, then located on Pike street, near Eleventh street, and worked at his trade for many years at the Fort Pitt Foundry. While employed there he molded the first large cannons used in the Civil War, the ornamental iron work for the steeple of St. Philomena's Catholic Church at Fourteenth and Liberty streets, Pittsburgh, and the ornamental plates over the foot paths on the first Sixth street suspension bridge, which was torn down to erect the present structure.

Mr. Sleeth was superintendent for a time of what was known as the Old Smith Foundry at Twenty-third and Smallman streets, from which place he went as foreman of the foundry of Bollman, Boyd & Baggaley at Twenty-



ROBERT SLEETH

fifth and Liberty streets, retaining this position until about 1870, when the firm of James B. Young & Co., operating the Phœnix Roll Works, was organized, of which he was a partner. At that time their works were removed to the present location at Forty-first street and the Allegheny Valley Railroad, the Westinghouse Air Brake Company having purchased the former location. After a number of changes in the personnel of the firm it was in 1896 incorporated as the Seaman-Sleeth Company, of which he was made vice-president. In late years failing health prevented him from taking an active part in the business, and he spent his winters in San Diego. He leaves three sons—William J. Sleeth and Robert L. Sleeth, Jr., of Pittsburgh, and George C. Sleeth, of Belleville, N. J.—and one daughter. He was a member of the United Presbyterian Church and for years was a trustee of the Sixth Church of Pittsburgh.

An interesting example of manila rope preservation has been learned of through the Cling-Surface Company, Buffalo, N. Y. By the use of Cling-Surface, the lubrication of the rubbing fibres of a rope transmission system comprising 1500 ft. of manila rope was found to have prevented the fibers from grinding themselves thin and weak after nearly five years' use of the system out of doors on the roof of a high building in open country. The rope was exposed to storms from Lake Erie and to other hardships connected with direct exposure to sunshine, dampness, freezing, dirt, etc. The owner of this plant employed the treatment as a method of preserving pliability, life and non-slipping qualities of the rope.

Pig-Iron Production in 1912

A Total of 29,727,137 Tons or 6,077,590 Tons More Than in 1911

(*See Table on Opposite Page*).

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of pig iron in the United States in 1912 and these are published in its statistical bulletin No. 1, issued January 30, from the office at 261 South Fourth street, Philadelphia. The total production of all kinds of pig iron in 1912 amounted to 29,727,137 gross tons, against 23,649,547 tons in 1911, an increase of 6,077,590 tons, or over 25.6 per cent. Several thousand tons of ferrophosphorus, ferrotitanium, ferrovanadium and other alloys are included for both years. The following table gives the half-yearly production of all kinds of pig iron in the past four years in gross tons:

	1909.	1910.	1911.	1912.
First half.....	11,022,346	14,978,738	11,666,996	14,072,274
Second half.....	14,773,125	12,324,829	11,982,551	15,654,863
Total.....	25,795,471	27,303,567	23,649,547	29,727,137

The production in the second half of 1912 is greater by 1,582,589 tons than that in the first half of that year.

Classified Production

The production of Bessemer and low-phosphorus pig iron in 1912 was 11,667,656 tons, against 9,409,303 tons in 1911, an increase of 2,258,353 tons, or over 24 per cent. In the second half of 1912 the production was 6,095,301 tons, as compared with 5,572,355 tons in the first half. The production of low-phosphorus pig iron alone in 1912 amounted to 282,359 tons, as compared with 282,460 tons in 1911.

The production of basic pig iron in 1912, not including charcoal iron of basic quality, was 11,394,477 tons, against 8,520,020 tons in 1911, an increase of 2,874,457 tons, or over 33.7 per cent. In the second half of 1912 the production amounted to 5,989,101 tons, against 5,405,376 tons in the first half, an increase of 583,725 tons. The production in 1912 was the largest in our history; the year of next largest production was 1910.

The production of charcoal pig iron in 1912 amounted to 347,025 tons, against 278,676 tons in 1911, an increase of 68,349 tons. A small quantity of pig iron made with charcoal and electricity is included in the figures for 1911 and 1912. In the first half of 1912 the production amounted to 166,366 tons and in the second half to 180,659 tons. No pig iron was made in 1911 or 1912 with mixed charcoal and coke.

The production of spiegeleisen and ferromanganese in 1912 was 221,725 tons, against 184,718 tons in 1911, an increase of 37,007 tons. The production of ferromanganese alone in 1912 was 125,379 tons, against 74,482 tons in 1911. Of spiegeleisen alone the production in 1912 was 96,346 tons against 110,236 tons in 1911.

The production of bituminous coal and coke pig iron in 1912 amounted to 29,135,527 tons, as compared with 23,141,296 tons in 1911, an increase of 5,994,231 tons, or over 25.9 per cent. In the first half of 1912 the production was 13,840,251 tons and in the second half it was 15,295,276 tons.

The production of mixed anthracite and coke pig iron in 1912 amounted to 233,873 tons, as compared with 212,548 tons in 1911, an increase of 21,325 tons. In the first half of 1912 the production amounted to 64,999 tons and in the second half it amounted to 168,874 tons. The production of pig iron with anthracite coal alone in 1912 amounted to 10,712 tons, as compared with 17,027 tons in 1911.

Furnaces in Blast and Building

The whole number of furnaces in blast on December 31, 1912, was 313, against 266 on June 30, 1912, and 231 on December 31, 1911. The number of furnaces idle on December 31, 1912, including furnaces being rebuilt, was 153, against 200 on June 30, 1912, and 235 on December 31, 1911.

The number of furnaces actually in blast for a part or the whole of the last six months of 1912 was 337, against 302 in the first half of the year. In the last half of 1911 275 furnaces were active, against 297 in the first half.

On December 31, 1912, there were 7 entirely new furnaces in course of construction, all of which will use mineral fuel, as follows: Pennsylvania, 3; Virginia, 1; Ohio, 1, and Minnesota, 2. In addition 1 coke furnace in Virginia was partly erected but work had been suspended for several years. In the last six months of 1912 but one entirely new furnace was completed, namely, the charcoal furnace of the Stephenson Charcoal Iron Company, at Wells, Mich. It has an annual capacity of 20,000 tons.

On December 31, 1912, 8 old furnaces were being rebuilt, all mineral fuel, as follows: New Jersey, 1; Pennsylvania, 1; Maryland, 1; Virginia, 1; Alabama, 1, and Ohio, 3.

In the last half of 1912 Tallapoosa Furnace, at Tallapoosa, Ga., was abandoned. It used charcoal for fuel when last in blast and had an annual capacity of 13,500 tons. In the first half of the year 7 furnaces, with an annual capacity of 215,000 tons, were abandoned, all of which used mineral fuel when last in blast.

Brier Hill Steel Company's Officers

The first annual meeting of the Brier Hill Steel Company, Youngstown, Ohio, was held last week at which directors were elected as follows: H. H. Stambaugh, John Stambaugh, David Tod, John Tod, R. C. Steese, J. G. Butler, Jr., E. L. Ford, W. A. Thomas and C. G. Thomas. The directors organized by electing W. A. Thomas, president; John Tod, first vice-president; R. C. Steese, vice-president and general manager; J. G. Butler, Jr., vice-president; J. E. Parker, secretary; John Stambaugh, treasurer; H. H. Stambaugh, chairman of board of directors; E. L. Ford, chairman advisory committee; Judge James B. Kennedy, general counsel. It is stated that the financial report of the company for the fiscal year was very satisfactory. Work is progressing rapidly on the new open hearth steel plant, which is expected to be completed and in operation by July 1, or perhaps earlier.

Iron Ore Production of India

The Government Geological Survey of British India reports the production of iron ore in India as follows:

Provinces.	1910 Quantity, Tons.	1910 Value.	1911 Quantity, Tons.	1911 Value.
Bengal:				
Burdwan	24,387	$17,786	5,456	$3,795
Orissa	.....	.....	300,000	19,500
Singhbhum	17,646	13,410	36,276	34,844
Other districts	620	1,265	610	1,153
Bombay	1	.....	1	.....
Burma	7,480	9,700	20,995	27,240
Central India	268	350	585	759
Central Provinces	3,637	4,720	1,944	2,287
Hyderabad	485	627	223	287
Rajputana	64	82	68	88
United Provinces	38	50	22	30
Total	54,626	.....	366,180	.....

The Lehigh Valley Railroad Company has awarded contract to the Great Lakes Dredge & Dock Company, Buffalo, for the building of a modern ore dock, 600 feet in length, on the Blackwell Canal, at the company's Tifft Farm terminal in Buffalo. It will cost approximately $50,000, and $25,000 additional will be spent for dredging the canal approach to a depth of 23 ft. The dock, which replaces a portion of the company's wooden ore docks in this location, is to be completed and ready for operation at the opening of navigation.

The Public Service Commission of the State of New York has ordered the Lackawanna Railroad Company to eliminate its crossing at grade over the tracks of the Pennsylvania, the New York, Chicago & St. Louis and the Buffalo Creek railroads, near Smith street, Buffalo, by elevating its tracks, the work to be completed by January 1, 1914. Seven parallel tracks are to be crossed overhead by the double track of the Lackawanna.

More than two and one-half million dollars in benefits was paid in 1912 to members of the relief funds of the Pennsylvania Railroad system. A report just issued by the company shows that since the funds for both the lines east and west of Pittsburgh were established some 27 years ago $34,785,576.71 has been distributed to members or their families.

THE PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1912.

Statistics collected from the Manufacturers by The American Iron and Steel Association for the First Six Months of 1912 and by the Bureau of Statistics of The American Iron and Steel Institute for the Last Six Months of 1912, all in Gross Tons of 2,240 pounds.

Production in the First Half of 1912, 14,072,274 Gross Tons; Second Half of 1912, 15,654,863 Tons; Whole of 1912, 29,727,137 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States.	Blast Furnaces. In blast June 30, 1912.	Blast Furnaces. December 31, 1912. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1912.	Second half of 1912.	Total for 1912.
Massachusetts	1	2	0	2	8,793	8,573	17,366
Connecticut	3	3	0	3			
New York	17	19	10	29	880,581	1,058,650	1,939,231
New Jersey	1	1	6	7	2,773	34,103	36,876
Pennsylvania	108	128	35	163	6,035,773	6,516,186	12,551,950
Maryland	2	3	2	5	107,027	112,519	219,546
Virginia	6	7	18	25	120,127	136,040	256,167
Georgia	0	0	3	3	.....	.....	.....
Texas	0	0	4	4			
Alabama	19	25	24	49	887,512	975,397	1,862,909
West Virginia	2	3	1	4	129,155	145,205	274,360
Kentucky	1	3	5	8	24,017	44,743	68,760
Tennessee	9	7	12	19	145,076	193,162	338,238
Ohio	49	58	17	75	3,285,752	3,516,885	6,802,637
Illinois	20	22	4	26	1,304,227	1,583,132	2,887,359
Indiana	10	10	0	10	788,252	982,376	1,770,628
Michigan	10	12	4	16			
Wisconsin	3	5	2	7	153,420	149,950	303,370
Minnesota	1	1	0	1			
Missouri	1	1	1	2			
Colorado	3	3	3	6			
Oregon	0	0	1	1	199,789	197,942	397,731
Washington	0	0	1	1			
California	0	0	0	0			
Total	266	313	153	466	14,072,274	15,654,863	29,727,137

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	17	19	5	24	880,581	1,058,650	1,939,231
New Jersey	1	1	5	6	2,773	34,103	36,876
Pennsylvania	103	115	19	134	5,968,270	6,335,272	12,303,542
Maryland	2	3	1	4	106,377	112,226	218,603
Virginia	5	6	15	21	119,466	134,455	253,921
Georgia	0	0	2	2			
Texas	0	0	3	3			
Alabama	17	24	21	45	871,155	957,721	1,828,876
West Virginia	2	3	1	4	129,155	145,205	274,360
Kentucky	1	3	4	7	23,837	44,743	68,580
Tennessee	8	7	11	18	144,738	190,814	335,552
Ohio	48	58	15	73	3,285,511	3,515,201	6,800,712
Illinois	20	22	4	26	1,304,227	1,583,132	2,887,359
Indiana	10	10	0	10	808,258	957,683	1,765,941
Michigan	2	3	0	3			
Wisconsin	2	4	2	6			
Minnesota	1	1	0	1			
Missouri	0	0	1	1	195,903	226,071	421,974
Colorado	3	3	3	6			
Washington	0	0	1	1			
Total	242	282	113	395	*13,840,251	*15,295,276	*29,135,527

*Includes ferro-alloys made with coke and electricity, coke and natural gas, etc.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3	65,657	178,928	244,585
New Jersey	0	0	1	1			
Pennsylvania	3	10	12	22			
Total	3	10	16	26	65,657	178,928	244,585

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	2	0	2	8,793	8,573	17,366
Connecticut	3	3	0	3			
New York	0	0	2	2			
Pennsylvania	2	3	4	7	1,846	1,986	3,832
Maryland	0	0	1	1	1,311	1,878	3,189
Virginia	1	1	3	4			
Alabama	2	1	3	4	16,357	17,676	34,033
Georgia	0	0	1	1			
Texas	0	0	1	1			
Kentucky	0	0	1	1	518	2,348	2,866
Tennessee	1	0	1	1			
Ohio	1	0	2	2	241	1,684	1,925
Michigan	8	9	4	13	107,927	123,242	231,169
Wisconsin	1	1	0	1			
Missouri	1	1	0	1	29,373	23,272	52,645
Oregon	0	0	1	1			
California	0	0	0	0			
Total	21	21	24	45	*166,366	*180,659	*347,025

*Includes small quantities of pig iron and ferro-alloys made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	242	282	113	395	13,840,251	15,295,276	29,135,527
Anth. & anth. & coke	3	10	16	26	65,657	178,928	244,585
Charcoal	21	21	24	45	166,366	180,659	347,025
Total	266	313	153	466	14,072,274	15,654,863	29,727,137

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts.	Blast Furnaces. In blast June 30, 1912.	Blast Furnaces. December 31, 1912. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1912.	Second half of 1912.	Total for 1912.
Pennsylvania.	Lehigh Valley	10	15	10	25	444,533	507,535	952,068
	Schuylkill "	11	12	6	18	427,482	481,781	909,263
	L. Susq. "	8	11	4	15	230,518	332,256	562,774
	Juniata "	2	3	4	7	61,329	61,692	123,021
	Allegheny Co.	43	44	3	47	3,074,961	3,032,167	6,107,128
	Shenan. Valley	16	22	2	24	945,029	1,118,271	2,063,300
	Miscel. bitum.	16	18	2	20	850,075	980,498	1,830,573
	Charcoal	2	3	4	7	1,846	1,986	3,832
Ohio.	Mahoning Val.	19	20	4	24	1,424,685	1,464,878	2,889,563
	Hocking "	0	0	1	1	938,232	1,111,931	2,050,163
	Lake Counties	13	16	1	17			
	Miscel. bitum.	9	13	3	16	724,410	733,142	1,457,552
	H. R. bitum.	7	9	6	15	198,184	205,250	403,434
	H. R. charcoal	1	0	2	2	241	1,684	1,925

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	276,596	345,295	621,891
Pennsylvania	2,152,153	2,250,038	4,402,191
Maryland	106,377	112,226	218,603
Virginia, West Va., Kentucky, and Tenn.	138,216	178,601	316,817
Ohio	2,015,369	2,162,598	4,177,967
Illinois, Wisconsin, Colorado, and California	883,644	1,046,543	1,930,187
Total	5,572,355	6,095,301	11,667,656

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	101,542	129,503	231,045
	Schuylkill Valley			
	Lower Susquehanna Valley	41,802	50,682	92,484
	Allegheny County	1,253,258	1,264,171	2,517,429
	Shenango Valley	755,551	805,682	1,561,233
	Miscellaneous bituminous			
Ohio.	Mahoning Valley	939,257	906,846	1,936,103
	Lake Counties	571,205	668,829	1,240,034
	Hanging Rock bituminous	504,907	496,923	1,001,830
	Miscellaneous bituminous			

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey	167,275	219,182	386,457
Pennsylvania—Allegheny County	1,719,000	1,636,489	3,355,489
" Other counties	1,358,734	1,775,565	3,134,299
Virginia	334,848	317,117	651,965
Alabama			
Ohio	762,752	791,615	1,554,367
Indiana and Illinois	928,000	1,107,910	2,035,910
Michigan and Colorado	134,767	141,223	275,990
Total	5,405,376	5,989,101	11,394,477

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	79,646	107,969	187,615
Illinois	13,515	20,595	34,110
Total	93,161	128,564	221,725

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1908 TO 1912.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.) 1908.	1909.	1910.	1911.	1912.
Massachusetts	13,794	18,388	16,582	9,649	17,366
Connecticut					
New York	1,019,495	1,733,675	1,938,407	1,562,756	1,939,231
New Jersey	225,372	294,474	264,781	40,663	36,876
Pennsylvania	6,987,191	10,918,824	11,272,323	9,807,073	12,551,950
Maryland	183,502	286,856	326,214	255,816	219,546
Virginia	320,458	391,134	444,976	293,642	256,167
Georgia	24,345	26,072	14,725	1,200	.....
Texas					
Alabama	1,397,014	1,763,617	1,939,147	1,712,211	1,862,909
West Virginia	65,551	228,282	174,661	291,472	274,360
Kentucky	45,096	86,371	100,509	95,202	68,760
Tennessee	290,926	333,845	397,509	324,648	338,238
Ohio	2,861,325	5,551,545	5,752,112	5,310,506	6,802,637
Illinois	1,691,944	2,467,156	2,675,646	2,108,002	2,887,359
Indiana	348,096	964,289	1,250,103	1,163,932	1,770,628
Michigan					
Wisconsin	148,938	348,177	307,200	276,807	303,370
Minnesota					
Missouri					
Colorado	313,071	382,766	428,612	395,968	397,731
Washington					
California					
Total	15,936,018	25,795,471	27,303,567	23,649,547	29,727,137

The Efficiency Society is to hold its next monthly meeting for New York members at the Aldine Club, 200 Fifth avenue, Wednesday evening, February 26. The subject for discussion will be "Efficiency in Transportation."

The Simplex Electrical Company, Boston, Mass., has changed its name to Simplex Wire & Cable Company, but the change of name has been effected without any change in management or interest.

Ohio Compensation Law Declared Defective

Former New York Commissioner of Labor Criticises the Ohio Statute and the Norwegian Measure Used as a Model

P. Tecumseh Sherman, former Commissioner of Labor of the State of New York, at a luncheon of the Business Men's Club, Cincinnati, Ohio, January 17, gave an address in which he severely criticised the Ohio compensation law. Incidentally, he pointed out the defects of the compensation law of Norway from which the Ohio law was modeled and also touched on other comparatively successful compensation laws in operation abroad.

Mr. Sherman said in his opening remarks that a 50 per cent. compensation law should be the substitute for our law of negligence between employers and their workmen, and it should be regarded both as a measure of private justice and as a public regulation for accident prevention. He went on to say that elective compensation laws, such as have been adopted in several States, are merely makeshifts to avoid a constitutional doubt or difficulty, and consequently should be regarded as temporary expedients on the way to compulsory compensation. As to insurance, he said among other things:

Insurance a Secondary Question

"Insurance is no more an essential feature of the compensation law than it is of our negligence law. We should therefore keep the problem of insurance distinct from the problem of framing a compensation law; and should first formulate our compensation law and then decide what provisions for insurance are desirable."

Another point he made was that in affording protection to workmen it should be required by law that all employers' liability insurance shall run directly for the benefit of the injured workmen and an insurer shall never underwrite less than the employers' liability. He also said:

"But there is a specific danger under the compensation law that insurance may thwart its purpose as a regulation for accident prevention. If an employer with a high risk is enabled to insure his liability at the same rate as a competitor with a distinctly lower risk; or if an employer with a low risk is compelled to pay for his insurance the same rate as a competitor with a distinctly higher risk, the effect of the compensation liability, as an incentive to the employer to study out methods and to incur expense to decrease his risks in order to cut down his rate of insurance, will be defeated. The cost of his insurance is the civil penalty each employer pays for maintaining the hazards of his business; and to be effective it must be closely proportionate to those hazards.

Does Not Favor Compulsory Insurance

"In my opinion, insurance of compensation should not be made compulsory except when and where that may be found by experience to be necessary to secure to the injured workmen their rights under the law. Railroads and other large establishments, which have their risks well distributed, may properly carry their own insurance; and it would be a pure economic waste to compel them to insure, simply to round out a paper scheme. English experience indicates that it is not necessary to make insurance obligatory in order to secure relief to the injured. In England, where insurance is voluntary, experience shows that employers generally insure of their own free will; so generally that there is almost no record of loss of compensation by workmen on account of the bankruptcy of employers."

Operation of the Norwegian Law

Concluding a general review of the principles of his subject, Mr. Sherman took up the Norway law. He said:

"In Norway the state itself has assumed the liability to pay compensation for industrial injuries; and it taxes employers, at rates graded according to a rough estimate of the degree of risk in their respective trades, to maintain a fund out of which the payments are made. Government officials do everything—manage the fund, fix the rates for the various trades, assign the employers to trade classes, investigate claims and decide and pay the awards. The employers are discharged from all responsibility for accidents when they have paid their annual premiums; if the premiums prove to be insufficient, the state loses, and the taxpayers generally must make good the deficiency. That happened once; and there was a serious political struggle before it was settled who should be taxed to make good the deficiency. This monopolistic method of insurance effects some saving by eliminating the expenses of competition and by the free use of existing political machinery in administration; and therefore, in a thinly populated country with widely distributed petty industries, like Norway, it is not without theoretical advantage. But in economy it does not compare with voluntary mutual insurance; and in comparison with stock company insurance in Great Britain, it is cheap only for the bad risks, while more expensive for the good risks."

Faults of the System Which Served as Model

He voiced these objections to the Norway law:

"It has resulted in a flat rate for all employers in each trade without proper regard to the variations in hazards in the different establishments.

"It places employers absolutely at the mercy of political officials as to which of the several trade classes they respectively may be assigned to, and consequently as to which of several widely different rates they may be taxed.

"The allowance of claims and the adjustment of awards are absolutely in the discretion of political officers.

"It breaks the direct relation between employers and their injured workmen, and whenever the efficiency of a workman is partially reduced by injury, instead of being employed by his employer at a lighter task and at reduced wages, and then compensated for the reduction in wages only, he is cast out altogether and established as a full pensioner upon the insurance fund.

"This method of insurance may be fairly described as a crude scheme to avoid the difficulties of adjusting and securing private rights and liabilities between employers and employees by turning the whole matter of compensation over to a political bureau. The Norwegian law is one of the earliest of the compensation laws, and yet it has never been copied in Europe, for the reason that it is generally condemned by experts.

"In Norway alone is state insurance given a monopoly. But in some four or five other countries state insurance is maintained in competition with various forms of private insurance. In such competition, its relative inefficiency has been clearly demonstrated, and it is either losing ground or being sustained only by public subsidies and legal privileges."

The Ohio Law Analyzed

Mr. Sherman then turned his attention to the Ohio law:

"Now let us take up the Ohio law. That law gives the State Board a monopoly of compensation insurance—for those who elect compensation must insure with that board. Under an elective law that condition undoubtedly deters some employers from electing compensation and thereby deprives their employees of the benefits of the compensation law. And why establish a monopoly? Monopoly leads to laxity, comparative inefficiency, and to indifference to incidental abuses, injustices and defects, which would be cured under the stress of competition. Perpetuate the theory of the existing Ohio law, and, when it is made compulsory, all the industries of the State will be placed at the mercy of a political monopoly, to be taxed at its discretion, without check or supervision.

"Even in Norway the railroads, the only concerns there large enough safely to carry their own risks, are exempted; while in Ohio all establishments, without need or reason, will have to pay tribute to your bureaucratic scheme. The better classes of employers—those with relatively low risks—will surely be dissatisfied with their treatment. There is no necessity for embracing this

certain evil. Why not try out the various methods of insurance in competition first, and learn from experience which are the better, before giving a monopoly to that form which foreign experience indicates to be the worst?

POLITICAL OFFICERS GIVEN TOO MUCH POWER

"The Ohio law leaves the allowance of claims and adjustments of awards absolutely to the discretion of political officers—with the exception that the claimant, if dissatisfied, may appeal to the courts. It is obvious, therefrom, that the working people are unwilling to be subjected absolutely to the power of such officials. Why, then, in common fairness, should employers be, when ultimately they are to pay the awards? Experience everywhere indicates that such a practice results in extreme laxity in guarding against fraudulent impositions and exaggerations, and in a tendency on the part of officials to misuse their powers to distribute political favors or charitable relief at employers' expense.

"Malingering is the bane of the compensation laws, and unless an elaborate system of checks upon impositions is maintained (and there is no sign of a check in the Ohio law or in the practices of the Ohio Board), there will be as great a proportion of parasites living in idleness off your compensation law as there are unworthy beneficiaries under our national pension laws. On the other hand, the same officials who make the awards also fix rates and collect the funds. If, through mistake, the rates are fixed too low the disposition of the officials will be to squeeze the awards for a while, so as to make ends meet and hide their mistake, regardless of the just rights of the injured workmen.

NO INSURANCE GUARANTEES UNDER THE STATE

"Foreign state insurance is always sound, because the state itself assumes the obligation and pledges all its credit to pay the compensation. But under the Ohio law the State assumes no obligation and guarantees nothing. No one is liable for a deficiency if one occurs; the employers are discharged (probably—but if not, they are being fooled), and the officials are irresponsible. Consequently, in case there should be a deficiency, there is no assurance that the injured workmen, who had received awards, would be paid. Foreign experience has been that the true cost of a compensation law is not ascertainable for several years—the injured workmen do not learn to put in their claims, impositions do not arise, and the cost of surveillance, adjustments, etc., does not begin to be realized until then. Therefore, when the Ohio Board, after a few months' petty experience, boasts that it can sell insurance at about half the rates figured out by all experienced actuaries, it seems only too probable that it is treading the path the foreign state insurance offices have trod, and is heading straight toward a deficiency, toward trouble for the State of Ohio.

STATE INSURANCE IS NOT CHEAP

"Foreign experience shows that state insurance is not cheap—particularly not for the employers with low risks. In Norway the cost of administering the insurance (which is paid by the state) is, it is true, kept very low. But the rates of insurance charged to employers average about as high as in Great Britain (where the rates cover expenses of administration), and, being flat, are much higher for the better classes of establishments than in Great Britain.

"The foreign state insurance offices never properly differentiated their rates according to hazards. It is argued that the failure of the state insurance offices to differentiate rates is simply accidental, and that a state bureau might do so as well in this respect as a private company or mutual association. The answer to this contention is that a state insurance office cannot do so without sacrificing its claims to cheapness. Public service is more expensive than private service; and if the state furnishes a service equivalent to that of the private companies it will cost more.

"The Ohio Board, however, claims that it can differentiate rates properly without inspection, purely upon experience—that is, upon the past records of establishments in the line of accidents. That is absurd. One should not insure a boiler, an elevator or a flywheel on its past record. Incidentally, this reveals another defect of the Ohio insurance. The average small employer has no one expert enough to inspect his elevators, boilers, flywheels, transmission machinery, etc., and he needs such inspection to protect himself against accidental injury to his plant and machinery, even if he be insured against all liability to his workmen. From private companies he receives such inspection, guaranteed, as an incident to insurance, at little, if any, further expense. Under the Ohio plan he must go without such inspection or procure it at heavy extra expense.

DANGER OF UNJUST LITIGATION

"The Ohio compensation law leaves employers liable to full damages under the negligence law for injuries due to violation of statute by the employer or by any of his employees (see section 21-2, where the word 'agents' is used meaning 'employees'). So that if a workman—without any fault on his employer's part—violates a statutory regulation for safety, in consequence whereof he and some of his fellow workmen are injured, those fellow workmen may hold the employer liable in full damages, as if for a wrong (for which liability he is uninsured), while the real wrongdoer is insured compensation at his employer's expense. And even where an employer has done his best to comply with the law, he nevertheless may be held, rightly or wrongly, not to have complied with it, so doubtful is the exact method of complying with some statutory requirements.

"Thus, although the employer pays to insure compensation to his workmen regardless of their faults, he is himself uninsured against the chances of litigation for damages whenever compliance with a labor law is in question. And, with the probability of injured workmen falling into the hands of 'ambulance chasing' attorneys, that chance is serious, and subjects all industry to the constant peril of financial ruin. So far from being a true compensation law, the Ohio law should be entitled: 'An act to perpetuate ambulance chasing.'

EMPLOYER SHOULD HAVE ADEQUATE PROTECTION

"The Attorney General of Ohio has ruled that it is against public policy, and therefore unlawful, for any employer to insure against his liability for damages under the Ohio act for violations of safety statutes by himself or his agents. I am not competent to discuss the public policy of Ohio. But it certainly is not against sound public policy. All foreign laws permit it. The Ohio act makes the employer insure his workmen against their faults and violations of statutes. Why, then, is it wrong to allow him to insure himself against his own unintentional violations of statutes, and against his liability for violations of statutes by his agents? It is contended by the Ohio Board that that would be like insuring against a crime. Nonsense! This is a civil and not a penal liability.

"The Washington law is an insurance law something like that of Ohio, only not so bad. Both the Washington and Ohio State insurance boards are seeking to attract employers by exceptionally low rates. But those are merely initial or trial rates, which, if foreign experience is any guide, not only cannot be maintained but, because they will result in deficiencies, will lead to unduly high rates or calls for State subsidies later.

German and English Laws Considered

"The German industrial accident insurance law deservedly ranks high, yet its success is due more to its fitness for conditions in Germany and to perfection in details and in administration than to the essential merits of its scheme. The difficulties in the way of adapting it to American conditions are practically prohibitive. The British compensation law makes each employer directly liable for compensation to his injured workmen, and permits him to insure it or not as he chooses—and how he chooses. Another type of compensation law common in Europe simply goes one step further than the English law, and requires the employer to secure or insure the payment of the compensation in some one of several specified ways—insuranc in stock companies, mutual associations, joint benefit funds and state insurance offices being the prevailing alternatives.

"I contend that the English law is in general the best model for us to follow. If public sentiment demands compulsory insurance, then it is a very simple matter to add provisions requiring insurance. But employers should be allowed to insure at their option in any sound and proper manner, and proper provisions should be adopted in our laws to regulate all sound and proper methods of insurance equally. In its general outlines the Michigan law fulfills this idea, but it is open to improvement in many particulars."

The Engineer in Industry *

The Type of Man Needed for the Executive Positions in Manufacturing

BY JOHN CALDER

The last twenty years' growth of the industrial arts has been characterized by a steady advance in the part which the engineer has played in them and in our modern civilization as well. In all branches of productive and distributive endeavor mines, factories, railroads, water-carriage and public utilities, men of purely clerical and commercial experience have been replaced to a considerable extent by engineers. The latter, by reason of the discipline of their profession, namely, sound scientific and practical mechanical knowledge always directed toward the careful analysis and economical solution of specific problems, have often developed the executive faculty as well, and the combination of self-reliance, leadership and trained judgment, has placed many engineers high in industrial organizations.

Tredgold's famous definition of "engineering," which, outlined in 1828 the scope of the first engineering society, has long been the engineer's Magna Charta, namely, "The art of directing the great sources of power in nature for the use and convenience of man." It needs, however, to be interpreted to-day in its widest sense. The machine shop, in all its grades of responsibility, the drawing office, the consultants' sphere, the mechanics of transportation, the erection of engineering structures and other field work, no longer comprise for the engineer "the daily round, the common task, that furnish all we ought to ask."

The young graduate of to-day has an exhilarating executive prospect before him, if he will but prepare for it. It is quite true that the beaten path is crowded and that many fall by the wayside, yet apart altogether from purely engineering vocations, in every art and industry in this twentieth century, scientific standards of attainment and of intensive and economical development are being demanded and the ground as yet is hardly scratched. To meet the practical and executive problems involved, no matter what the industry may be, men with the scientific discipline are absolutely necessary.

At present many of these are being trained and designated as "engineers" for lack of a more comprehensive title. Tredgold's definition, however, is still wide enough to cover modern demands, if the great vital forces of nature are included in our view and practice, and are not neglected in college days and in personal culture. The place of the engineer in the business world of to-day is, on the last analysis, conditioned by his character, by the liberality of his professional, scientific and cultural preparation, and *not* by his degree of familiarity at the outset of his career with the details of any one industry.

A Broad Culture Demanded

For the engineer to fill an organization position to-day acceptably and with scientific and technical proficiency, there must go with these, as I have said, a broad general culture. The proper study of mankind is man, and many an engineer has failed of success in organization work because he wholly omitted to study human nature, to allow for it in his plans and to handle it intelligently in his daily routine. So long as he is content to be an individual designer of distinction, a consultant on purely mechanical matters, or a specialist in the numerous branches involving no organization, the lack of a broad culture may not affect him professionally. Yet its absence is a great and crippling deprivation for the social being and the citizen. It is far easier to turn men out of our colleges mechanical experts than it is to create men who are thoughtful, men who know themselves and know the world of to-day and of the past.

The value of the modern college man to society does not lie in the ability to do always the same thing that everybody else is doing. College men should be fitted by liberal studies (many privately acquired) to *make* public sentiment as well as to follow it. Our educated leaders of thought in all lines should be in advance of their period and should be capable publicists. In the end it is not a question whether a man is a great engineer or a great electrician, it is a question of his individual character, and this is determined by his culutre, not his profession.

The Ability to Get Things Done

Perhaps of all the requirements of the professional engineer, either with a place in an organization or seeking such, none is so vital as the executive faculty, or the art of getting things done. This should not be confused with personal ability to do things. This quality is closely allied to character and may be developed with care, but it is partly a natural gift.

There be men who can invent and scheme, men who can clothe a scheme in engineering dress, who can carry financial and commercial preliminaries skillfully through, but who prove unable to get the scheme itself carried out to a rapid and satisfactory conclusion. Not a few young graduates find themselves in the unfortunate condition of knowing how to do a thing without being able to get it done. When it is finished in figures, on paper or in talk, some men have lost all interest in it. It is for them merely a creation of the mind. It has no objective reality, no social usefulness, no challenge to endeavor and to make good. This kind of man may be a good calculator, or an excellent estimator, but he is no engineer. He has mistaken his vocation.

The engineer is always in at the finish. His task interests him to the last step. This lack of interest in something attempted and something accomplished bids fair to mar even the mental operations of the engineer and the judicious modification of his formulæ. The present graduate often fails lamentably at this point. Our engineering graduate is often uncertain about what he is to do with his profession beyond making a living out of it. When this is so and continues—when there have been no hours of insight and vision in the world of art, ideas, letters and morals, it will go hard with him to understand other men, to attract and influence them and to bend them to his purpose. Yet *this* is the secret of executive success.

But the ability of the young engineer to get others to work efficiently under him must be supplemented by the faculty of getting along harmoniously himself with other executive officers in the organization. It may appear on a narrow view of things to men of a self-centered stamp that personal ends can be best achieved by holding aloof from their fellows. It may even prove immediately advantageous in some circumstances, but failure to co-operate heartily, whether it is ostentatious or concealed, is a fatal defect in the engineer who wants to go far and high in his profession. No man ever failed in life through doing too much for others. It cannot be too strongly urged upon the young graduate that, however humble the start he may have to make, a determination to do his level best to make things "go" will not do a little to make up for some holes in his mathematics.

Team-work is of the essence of modern progress, and the higher engineering and industrial executives are more on the alert to perceive and to reward it than ever before.

Corporations and Scope for Advancement

This is the age of corporations and much pessimism has been uttered and written on their alleged suppression of the individual. Yet organization for production on a large scale is absolutely necessary in our present civilization, and there will be more of it, not less. Corporations have almost invariably shown more concern to build up their staffs of the best material and to promote their young men than have private and family concerns, in which there is often, designedly, no room at the top.

As a matter of fact, the heads of organizations of every kind, including many industries to-day in which the engineer of the past never hoped for a career, are looking for young engineers who have proved themselves by a reasonable practical discipline after graduation. They are selecting men daily, frequently young men, partly from their record, but chiefly for their potentialities, particularly for signs of executive ability (a not too plentiful quality). They expect them to win out solely on their merits and to make the most of the business by making the most of themselves. Any slackness that may remain unobserved is making its mark upon the delinquent just the same, and will have to be reckoned with later on as a disqualifying habit.

The best organization leaders to-day realize fully that they cannot reach the highest success unless they see and

*From a lecture delivered last month before Stevens Institute of Technology, Hoboken, N. J.

plan for an opportunity for a useful and profitable career, not only for themselves, but also for the members of their staffs. Let no graduate be discouraged by his coming day of small things. We have all been there. Let him keep his ambition warm and use the chance at hand for all it will yield of knowledge and experience. He will be paid and that sparingly for what he does, not for what he knows or learns. The rich dividends and advancement of later years, however, are largely dependent upon the way in which the graduate fills up his business and his leisure hours during the first five years of engineering practice.

Can Success Be Commanded?

Lastly and in a very few words, consider a question which young men qualifying for all professions have frequently on their minds, viz.: Can success be commanded?

Most men begin by attaching much importance to natural gifts, but as they advance in life and in knowledge of the world they are greatly inclined to lay immense stress on the efficacy and the fruitfulness of persistent toil. As the years roll on, some looking backward would credit what is called "luck" with a good deal and some famous men have been so disposed. But, while admitting that faculty and good fortune have much to do with success in life, we may be sure that work counts for much more than either. A man with very moderate abilities who goes on toiling purposefully from day to day is likely to attain his object.

Can success then be commanded? Not quite. There are some walls in the way of most men which cannot be scaled, but on the whole a certain measure of victory can be reached by any man with four special qualifications apart from his solid professional preparation. These are: (1) A definite object in view, (2) a determination not to be defeated, (3) a capacity of exercising continued self-denial, (4) a certain belief in his own powers.

This is a true saying, "Give half an hour's close intellectual attention every day to any subject and by the time you are forty you will rank as an authority on it."

A Recently Developed Type of Clam Shell Bucket

A new type of rope reeved clam shell bucket has been recently brought out by the Browning Engineering Company, Cleveland, Ohio. The bucket was designed by M. W. Allen, who has had some 25 years' experience in designing buckets, and is intended for extra heavy digging, such as iron ore, slag, rock, clay, etc. It is simple in design and constructed to withstand hard service. Fig. 1 is a view of

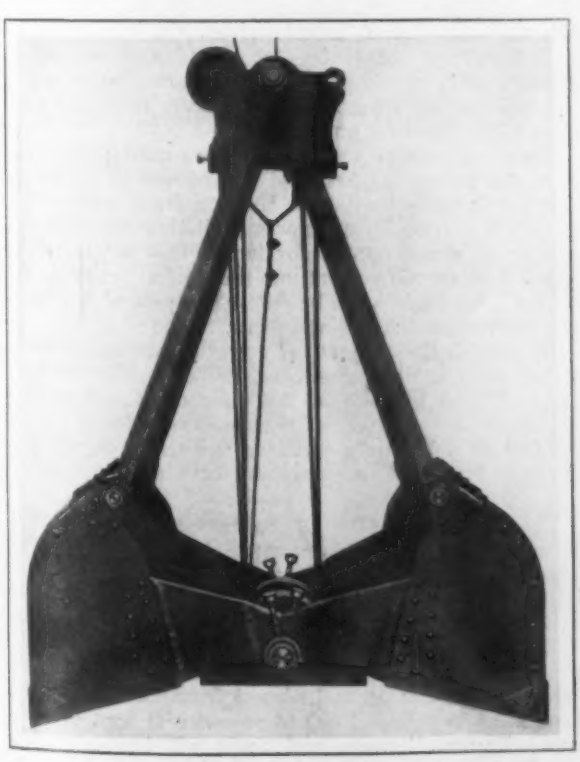


Fig. 1—The New Type of Rope Reeved Clam Shell Bucket Brought Out by the Browning Engineering Company, Cleveland, Ohio

Fig. 2—The Bucket in Use for Unloading Lump Material

the bucket opened and Fig. 2 shows it in use for handling heavy material.

The bucket is of the two-rope type, its mechanical operation being similar to that of the company's standard style. It can be used on locomotive or overhead traveling cranes, hoisting engines or derricks. The large main bearings are of steel with bronze bushings and plates fastened with angles are employed for the shells. The sheaves are placed at right angles with the top and bottom castings, thus forming a housing and making it practically impossible for the rope to run off the sheaves. The cable is reeved so that the load is on the center sheave instead of on the outer ones.

The provision of grease cups on the working parts so placed that they are not in danger of being knocked off is emphasized. They take the place of oil holes and are not so likely to become clogged. The bucket is made in several sizes, ranging in capacity from ¾ to 2 cu. yd., the 1-yd. size being the one illustrated.

New Canal Dover Steel Plant

A new steel plant for the manufacture of sheet bars and sheets is practically assured for Canal Dover, Ohio, as a result of recent negotiations. Several Pittsburgh steel men or steel workers are interested in the enterprise among them being W. M. Parkin, H. T. Myer, Archibald Smith and M. S. Young. A few days ago Mayor F. L. Bixler of Canal Dover learned that the Pittsburgh men were looking for a site for a steel plant and largely through his efforts the project was secured for his city. A conference was held with the local Board of Trade and an agreement was quickly reached and books were opened for local stock subscriptions. Citizens of Canal Dover agreed to subscribe for $200,000 of preferred stock in the company. A 38-acre site for the plant was donated by the Penn Iron & Coal Company which operates Dover furnace, one of M. A. Hanna & Co.'s properties. The site adjoins that of the Dover furnace which will furnish hot metal for the steel plant. The new company will be incorporated with a capital stock of approximately $1,000,000 and will probably be known as the Dover Steel Company.

The Ohio Iron & Steel Company's Mary furnace at Lowellville, Ohio, has been put in blast after being relined and extensively repaired. It now has a rated capacity of about 400 tons per day. About 80 per cent. of the output of the furnace for all of this year is under contract to the Youngstown Sheet & Tube Company.

Heat and Power in Manufacturing Processes

Passing Steam for a Heating Process Through a Steam Engine Even Though High Back Pressure and Large Cylinder are Needed

BY STERLING H. BUNNELL

In a large proportion of present-day manufacturing operations, heat as well as power plays an important part. Among such processes are paper-making, desiccation of moist materials and food-products, ice-making with distilled water and the manufacture of many drugs and chemicals. Steam, as the transmitting agent by which heat may be applied at the point desired, possesses peculiar advantages because of the exact relation between its temperatures and pressures. It is only necessary to provide saturated steam at the proper gauge pressure to insure maintenance of the corresponding temperature. Since furnace and boiler can be operated at fair efficiency, and steam in well covered piping can be transmitted over moderate distances with small loss, the steam heating cycle affords little room for improvement.

The power which is required for most manufacturing operations is obtained from gravity, by water wheels, or from heat, by steam or gas engines. If water-power (or electric current therefrom) is used, the cost of any heat required must be added to the cost of power, and the total applied as a charge to the cost of manufacture. Electric power for manufacturing purposes is sold at prices ranging between 1 cent and 4 cents per kilowatt-hour, with some few extremes outside of these figures. Allowing for losses in circuit and motors, a horsepower delivered to the factory machinery is about the equivalent of a kilowatt at the factory meter. For the purpose of comparison, we may assume an average low charge of 2 cents per horsepower-hour delivered to the factory machinery. For a process requiring heat, assuming the use of average coal of 10,000 heat units per pound, at a price of $3 per ton, and burned so as to put 60 per cent. of its heat value into the steam boiler, 10,000 heat units in the boiler would cost ¼ cent. As one boiler horsepower-hour is equivalent to 33,300 heat units put into the boiler, the fuel cost of a horsepower-hour of low-pressure steam under the assumed conditions is about 8-10 cent. But for this fuel cost, very nearly the same quantity of steam could be delivered at high pressure to an engine, and after doing a horsepower-hour of work, would still be available for heating purposes, with a small loss only.

The fuel cost of a horsepower-hour of work by a steam engine under these conditions is therefore about 8-10 cent; and this includes the cost of about 30,000 heat units net, available for heating purposes at 212 deg. F. The additional fuel cost of doing work with the steam before using it for heat is only about 10 per cent. If the cost of heat is 8-10 cent per horsepower-hour with steam, the cost of electric current would need to be as low as 1-10 cent per kilowatt-hour at the switchboard, to compete with steam-power (on the basis of fuel cost alone) where all the exhaust steam can be used for heating purposes. Even with plant charges provided for most liberally, there is no possible way to figure a loss on the development of all the steam-power that can be furnished by the quantity of steam required for heating. Wherever large amounts of heat are required in a manufacturing process, low electric power cost cannot be the determining factor in locating the plant at a point where fuel cost is high.

The Possibilities of Using Exhaust Steam

It has been stated above that there is a small loss in passing the steam through a steam engine and doing work before using it for heating purposes. The fact is that this loss is surprisingly small. It is true that the laws of thermo-dynamics, on which the operation of the steam engine depends, show that work is done in the engine by virtue of a loss of heat in the steam; but with steam engines under ordinary conditions not more than 10 per cent. of the steam can possibly be condensed in doing work in the engine. Nine-tenths of the heat remains in the exhaust steam for further use, or waste.

The possibilities of the use of steam exhausted from engines have hardly been touched. Hitherto, power-plant engineers and engine builders have confined their attention to applying exhaust steam at atmospheric pressure to heating buildings and boiler feed-water. Large quantities of live steam are commonly taken direct from boilers, through reducing valves, and used at pressures from 50 lb. downward, for dyeing, distilling, cooking, digesting, plating and other processes. In all these operations, power in considerable quantities can be developed by simply substituting an engine for the reducing valve. There is no difficulty in adapting standard steam engines to operate against back pressures as high as 50 lb. or more. Instead of buying a small steam engine to furnish power for an operation in which heat is required, and operating a large boiler to furnish steam for the engine and the heating operations separately, economical plant design would provide for generating steam at high pressure, and passing it first through an engine cylinder of proper dimensions to furnish the work required in the plant while expanding down to the exhaust pressure required. The steam would then be exhausted into the heating system and its latent heat usefully applied.

The Scheme of an Engine Exhausting at 40 lb

Suppose, for example, a drying operation in which a liquid such as milk is poured over slowly revolving heated rolls and the moisture evaporated to dryness, and that 10 hp. is required for mechanical work, and 20 boiler horsepower of steam at 40 lb. pressure is required for furnishing heat to the rolls. It is easy to buy in the open market, a standard steam engine with piston valve and of cylinder capacity such that 20 boiler horsepower (or 600 lb. per steam per hour) can be passed through its cylinder, and expanded from the boiler pressure of say 125 lb. down to a terminal pressure of 60 lb., while developing 10 hp. Such an engine could be made to operate without difficulty against the 40 lb. back pressure. The exhaust steam would contain some small quantity of condensed water, which could easily be removed by a separator, together with any oil. The drip water from the rolls, being at 40 lb. pressure, should be trapped off and kept under pressure, and returned by the trap system to the boiler. The heat originally put into the steam would thus be saved to the last heat unit.

Even in processes where there is no exact relation between the amount of heat and the amount of power required, it is easily possible to design a steam engine plant which will develop all the power available from the given quantity of steam needed for heat. This power can be delivered as electric current into the general power circuit, and the other engines can be relieved of part of their load, with a corresponding saving in fuel.

In general, the designer of power plants for processes of the nature of those mentioned should consider carefully the possibilities of obtaining his mechanical work and his heat from one and the same quantity of steam, and he will find no difficulty in obtaining the hearty co-operation of engine builders in meeting his requirements.

The Advertising Club, of Baltimore, whose executive offices are at 1 North Calvert street, is actively promoting preparations for the ninth annual convention of the Associated Advertising Clubs of America, which will be held in Baltimore, June 8 to 13. President Edward J. Shay, of the Advertising Club of Baltimore, has received responses from 35 clubs, promising a large attendance and there are 100 clubs yet to be heard from. Canada will be represented in force. England promises at least 30 delegates. France, Germany and Spain will be represented, as well as New Zealand and South Africa. Striking entertainment features are being arranged.

The Death of I. A. Mekeel

I. A. Mekeel, vice-president of the David Williams Company, died on Sunday, February 2, at the East Orange, N. J., home of D. B. Caldwell, president of the Wells-Fargo Express Company. He had been stricken just a week before with indigestion so acute as to affect the heart and had continued in such a condition that he could not be removed to his own home in Montclair, N. J.

Mr. Mekeel was born in Clinton, Iowa, September 25, 1870, the son of George M. and Maria Haviland Mekeel. He was educated at the Friends' Academy at Union Springs, N. Y., and at the age of 17 taught school near that town. Two years later he removed to St. Louis and connected himself with his brother, the owner of Mekeel's Weekly Stamp News, a paper published in the interest of philately. He gave proof of the business ability which afterward became so marked when at 21 he went to Europe to effect the sale of rare stamps. Subsequently he became the owner of Mekeel's Weekly, which is now published in Boston, and in which he was interested up to the time of his death.

Mr. Mekeel connected himself with the Textile Publishing Company in 1900 as a solicitor on the Dry Goods Economist in the New York market. In about a year he

I. A. MEKEEL

was appointed one of the special representatives not only of the Economist but also of its allied papers in the Root Newspaper Association. So successful was he in this work that in 1904 he was elected a director and secretary of the Textile Publishing Company and treasurer and general manager of the Root Newspaper Association.

On May 1, 1911, principally through the work of Mr. Mekeel, there were brought together, under the name of the United Publishers Corporation, a large number of prominent technical and business papers, including *The Iron Age*, Iron Age-Hardware, the Metal Worker and the Building Age. Of this parent corporation Mr. Mekeel became vice-president and treasurer. He was also an officer in a number of other publishing and printing companies.

Mr. Mekeel married on October 29, 1896, Elizabeth M. Schureman of St. Louis. He is survived by Mrs. Mekeel and three young sons, by his aged father and by two brothers, one of whom, G. D. Mekeel, is president of the Commercial Bulletin Company, publisher of the Twin City Commercial Bulletin.

Mr. Mekeel's sudden death in the prime of life, and when he seemed to be at the zenith of his powers, is mourned by a great number of business and social friends. He was well known in many centers other than New York and St. Louis, among these being Boston, Chicago, Minneapolis and St. Paul, and wherever known he was admired and respected. Of splendid physique, highly attractive personality and apparently unbounded vigor and energy, he won all with whom he came into contact. His shrewd business sense, though always at his command, never warped or unduly influenced his mental breadth or lessened his sterling qualities, derived from a Quaker ancestry. He was a magnificent example of the highest American type—full of life, of humor, of comradeship, and yet ever intent on the interests of the great business to which he had dedicated his career and in behalf of which he spent himself with all too great devotion.

To all of his immediate business associates he was more than a fellow-worker. To have known him, to have worked with him, is much; but to have had him as a friend is more. And it is as a friend, a loved and valued friend, that his associates most deeply mourn him.

The Chicago Foundrymen's Club

The Chicago Foundrymen's Club has announced for its next regular meeting night, February 8, a banquet at the Auditorium Hotel, followed by a programme of an entertaining and social nature, the advance prospectus of which is particularly inviting. Plans for the ensuing year were recently made by the board of directors, including the appointment of standing committees. O. J. Abell and C. B. Carter were named chairmen of the programme and education and entertainment committees, respectively. In conjunction with the Chamber of Commerce, the club will have charge of the entertainment features connected with the convention of the allied foundry associations to be held in Chicago early in October.

At the annual meeting of the club, officers were elected as follows: President, James Woods, Sheffield Foundry Company, Chicago; vice-president, L. C. Young, McDowell Foundry Company, Chicago Heights; secretary-treasurer, C. E. Hoyt (re-elected), Lewis Institute. Directors elected were: E. F. Axner, C. B. Carter, Henry Vrooman and J. G. Carrard.

The American Can Company announces the issue of 15-year 5 per cent. debenture bonds amounting to $15,000,000 and the statement is made that the back dividends of 32¾ per cent. on the preferred stock are to be paid in cash in the near future. These bonds will be callable at 102½. A sinking fund will be provided for the redemption of $500,000 annually. Arrangements have been made for the immediate sale of $14,000,000, and $1,000,000 will remain in the treasury. The statement is made that the quick assets of the company at the present time exceed $14,000,000 and will be kept at that figure as long as the $14,000,000 debenture bonds are outstanding.

A new club house for the Association of Employees of the New York Edison Company was opened February 4, at 113 East Twelfth street, New York. William T. Dempsey, who has charge of all of New York City's electric street lighting, is president of the association, which has as its chief objects welfare and educational work. Its members may avail themselves of a four-year course of instruction in electrical engineering under competent teachers without any cost to themselves. A thoroughly equipped laboratory is maintained for this purpose.

The Virginia Bridge & Iron Company, Roanoke, Va., has elected officers as follows: President, C. Edwin Michael; vice-president and treasurer, T. T. Fishburne; second vice-president, J. B. Fishburne; vice-president and chief engineer, J. K. Graham; secretary and assistant treasurer, John R. Parker; contracting manager, J. H. Whitner; erecting manager, G. A. Tretter; purchasing agent, G. M. Milliken; chief draftsman, B. L. Sneed. The past year was the best in the company's history.

"Port Facilities for Ships and Cargoes in the United States" will be the subject for discussion at a meeting of the American Society of Mechanical Engineers, Tuesday evening, February 11, at the Engineering Societies Building, 29 West Thirty-ninth street, New York. A paper on the subject is to be presented by William T. Donnelly.

The Steel Corporation Dissolution Suit

Inquiry Into the Royalty on Lake Superior Ore in Connection with the Hill Leases—William G. Gray's Statistics

Continuing the report of the New York hearing in the suit for the dissolution of the United States Steel Corporation, Tuesday, January 28, was given over to the examination of P. H. Nelson, Hibbing, Minn., who was called as an expert by the Government to show that the corporation paid an excessive royalty under the Hill ore lease in order to get control of the country's reserves. Since the suit was filed the corporation has given notice of the cancellation of the lease.

P. H. Nelson Examined

Mr. Nelson testified that in 1902 he acquired a lease on the Mesaba Range on which the royalties were 20c. a ton. The Hill lease, made in 1907, calls for 85c. and upward. The average rates of royalties on ores on the Mesaba Range in 1901, 1902 and 1903 were 25, 30 and 35c. a ton, he said, and from 1904 to 1907 they were from 40 to 45c.

"Were the royalties paid in 1907 by the Steel Corporation under the Hill ore lease higher than the royalties paid under other leases?" Mr. Nelson was asked.

"They were high at the time," was the answer.

"If you had a fee in property in a mine," asked Henry E. Colton, Government counsel, "and you could lease it for 50 years, carrying 1-50 of the tonnage to be taken out each year at a royalty of 50c. would you or would you not lease it at a lower figure than 50c. per ton?"

Mr. Nelson replied that he would rather sell outright for a cash rate on the estimated tonnage than get a royalty over a period of years. He testified that the Steel Corporation through its ownership of railroads in the Lake Superior region was able through the saving in freight rates to outbid its competitors for leases in ore properties. He said that the advantage of a company holding a railroad was represented by the net carrying profit per ton, and that in 1902 the Steel Corporation's profit per ton on a freight rate of 80c. a ton was 35c. This rate was reduced to 60c. about a year ago.

The high freight rates, he said, hindered development of mines by independents. Asked if a 40c. per ton freight rate would help the independents develop their property, he said he thought it would. Counsel for the Steel Corporation elicited the statement from him that small mining companies had failed in developing the ore deposits in the region where the corporation's holdings were, and that it was the financial resources of the corporation which brought the ore into use.

Mr. Nelson Cross-Examined by Hill Attorney

Mr. Nelson was taken in hand on the following day for cross-examination by Frederick R. Kellogg, counsel for the Great Northern Ore trustees, who asked on what Mr. Nelson had based his statement that the average royalty prevailing at the time that the Hill leases were effected was about 40 or 45c. per ton. The witness named several ore properties on which leases were made from 1904 to 1906 and 1907 at royalties ranging from 25c. to 50c. Asked to tell about leases of a later date, he mentioned several made in 1909 and 1910 at royalties of $1.25 and $1.35.

Mr. Colton, Government counsel, read into the record a copy of a brief on the method of taxation on iron ore property, presented in the Minnesota Legislature, signed by Chester A. Congdon and others, in which the Hill ore leases were referred to as being "not an ore lease but a deal in high finance", and it stated that the real rates of royalty ruling on the Mesaba Range at the time were more correctly represented by the rates paid by the Oliver Iron Mining Company. These, according to the sworn statement contained in the brief, averaged 27.2476c. for the years 1902-1908, inclusive.

Mr. Colton asked whether the Steel Corporation is making any special effort to take out as much ore as possible before the expiration of the leases.

"My impression," said Mr. Nelson, "is that they are taking out every ton they can."

"Are they selecting the best grades of ore or do they take it as it comes along?"

"Why, I suppose they are taking the cream—that would be sound business judgment."

Mr. Colton asked the witness to what he attributed the advance in royalties on ore properties following the signing of the Hill leases.

"I attribute it to the high rate stipulated in the Hill leases and also to the fact that after the Hill leases were effected there were fewer properties on the market."

William G. Gray Testifies

William G. Gray, chief of the bureau of statistics of the American Iron and Steel Institute, was asked by Mr. Colton to state when he first heard that the American Iron and Steel Association was to be taken over by the American Iron and Steel Institute. He first learned of the proposed step, he said, in May of 1912.

Mr. Colton wanted first to know whether now that this change has occurred the statistics will be gathered in the future in the same manner as they have been made up in the past.

"They will be," replied Mr. Gray, who had been called by the Government to show certain tables of production by the Steel Corporation and by the independents in the country, both pig iron and finished product. Mr. Gray's principal table seemed to please both sides. According to the Government it showed that the Steel Corporation was so great a producer that it could dominate all the rest of the trade and for the defense it showed that the corporation, no matter what its potentialities may be, has not endeavored to exercise a monopoly.

At the bottom of this table was a note stating that while the Steel Corporation formerly sold 15 per cent. of its output of ferromanganese to other consumers, it now, owing to the difficulty in obtaining suitable ore, consumes 98 per cent. of its own output. The note went on to state that though the output of manganese ore in this country in 1910 was 2258 tons, the imports amounted to 24,348 tons. Mr. Colton, believing that this statement would injure the Government's contention that the Steel Corporation enjoys a monopoly of the production of ferromanganese in this country, crossed out the note, inquiring of Mr. Gray if he had been asked to produce anything outside of the pig iron production tables.

"You told me to get the facts, that you were after facts, whether they operated for or against the Government. So I followed your instructions and here are the facts," said Mr. Gray, pointing to the table.

This afforded Mr. Colton an opportunity to read into the record from the minutes of the Carnegie Steel Company in 1898 a letter from its foreign representative, Millard Hunsiker, proposing an agreement with the English makers to control the market. The Englishmen proposed to let the Carnegie Steel Company fix the price for this country and to restrict their own sales here, while the Carnegie Company should sell in Europe outside of England at prices fixed by the Englishmen. According to the minutes read the arrangement was authorized.

Mr. Gray, the witness who was on the stand, said he never heard of the deal, and C. A. Severance, of counsel for the Steel Corporation, remarked: "That was 15 years ago."

Wire and Horse Shoe Pools

The session of Thursday, January 30, was taken up with the introduction of documentary evidence, which consisted of papers pertaining to the financing of the American Steel and Wire Company, a subsidiary of the corporation, and to the so-called Jackson wire pools. The former were identified by Frederick Strauss, of the banking firm of J. & W. Seligman & Co., which was con-

nected with the wire company's organization, and Mr. Strauss also said that the wire pool papers, which had been under the supervision of E. E. Jackson, had in all likelihood been destroyed. The others were identified by Samuel J. Bailey, secretary of the pools.

L. V. Hubbard, law partner of E. E. Jackson, head of the wire pools, was questioned by Government counsel as to the destruction of the minutes of the Horseshoe Association. Mr. Hubbard said that he knew nothing of the circumstances surrounding their disappearance, but believed that they had been destroyed "long ago." He thought that Mr. Jackson, who went to Europe after he was convicted and fined by the Government for participation in the pools, was still abroad.

At the conclusion of the hearing announcement was made that there would be no further sessions until February 10, when the Government may call a few other witness. David R. Reed, one of the attorneys representing the corporation, declared that the defense would require about eight weeks to prepare its case, and under the circumstances it would be some time in March before the calling of its first witnesses, which will include President Farrell, Chairman Gary and Director H. C. Frick.

The petition of the Attorney General for the dissolution of the Steel Corporation was filed October 26, 1911. The taking of testimony began in May, 1912, and there have been 42 sessions. About 100 witnesses have been examined.

The Plans for the Defense

The statement is published, with some appearance of authenticity, that Judge Gary will go on the stand ready to admit that practically every policy of the corporation in vogue today or that has been in vogue was one advocated by him and his friends. In his protracted testimony he will explain his idea and reasons for putting those policies in practice; he will tell how they have worked out and also how policies which other officers and other directors might have desired would have worked out, in the light of history.

It is believed that Judge Gary's term on the witness stand will take nearly a week, for he plans to tell a narrative that begins at the time he first went into the steel business, when a lawyer in Chicago. He will describe conditions then, the occasional pools, the competition wars that occurred when the pools were broken, the successive mergers and developments as the demand for steel changed from Bessemer to open hearth, in the rail field. He will describe the Andrew Carnegie policy and its effect not only on business generally, but on labor, on wages and the general prosperity of the districts affected, and he will take up the United States Steel Corporation from its inception, tell what policies his experience had shown to be best, discuss the pools he found around 1904 and what he did to break them up and then go into the famous dinners where prices were mentioned in speeches.

In revealing every step taken by the corporation he will assert that he proceeded under the best legal advice obtainable in this country, the counsel in the case of the Gary dinners being one great lawyer of New York, one from Philadelphia, one from Chicago, one from New Jersey and another from the South, all of whom agreed that the understandings or conferences did not violate any law. The climax of the testimony will be a question. "If the Government smashed the Standard Oil Company for crushing competition and dissolved the American Tobacco Company for buying out competition, what can it do to the United States Steel Corporation which slept in the same bed with the competition?"

The number of horses replaced by a motor truck does not always tell the whole story of the truck's superiority. An instance in point is two KisselKar trucks, the first of one and the other of two tons capacity, in the service of a concern at Woonsocket, R. I. These two trucks took the place of three teams of horses which had covered a total of about 42 miles a day. The trucks, besides doing this work, have taken on enough additional duty so that their record totals more than 100 miles daily. Suburban and interurban runs that were not made by the horses have been profitably added to the delivery service.

Smoke Abatement School for Stationary Firemen

Manufacturers, as well as municipalities, will doubtless be interested in an experimental training school for stationary firemen that is being conducted under the auspices of the Ohio Mechanics Institute at Cincinnati. The course is free and is intended to cover a period of six weeks, with two lectures a week the first four weeks, followed by visits to manufacturing plants the last two weeks. The class will be in charge of A. H. Hall, chief smoke inspector for the city of Cincinnati, and Prof. J. E. Muncy, of the Institute. The following is the initial programme:

Composition of fuels and of air; a clear, simple statement of the conditions necessary for combustion; principles underlying perfect combustion and smoke prevention.

Process of placing the fuel on the grate bars; of supplying the air necessary for combustion; consideration of the time element in its relation to the fireman's activity.

Relative amounts of fuel and air; very simple calculations; questions relative to points brought out in the first lesson.

Means of supplying oxygen at the proper time and place; jets, steam and air; their operation and management. Questions.

Proportions and character of furnace; effects of the circulation of water in the boiler on smoke production; waters, boilers, pumps. Questions on the preceding lessons.

Draft—natural and mechanical, forced and induced, etc.; various devices with their care and management; questions relative to the preceding lessons.

Materials employed in steam production—waters, fuels, air supply, boilers, grates, stokers, pumps and other feed water devices. Questions.

Care, use and application of various quantitative measuring instruments and devices; processes which assist in the diminution of dense smoke. Questions.

At the end of four weeks special instructors will be sent, during the hours of active operation, to the plants from which the firemen come, to make personal observations in specific cases.

Time periods are to be devoted to the following: 1. Visits to the plants operated by the students; thorough inspection, application of the principles learned in the earlier lessons to the conditions found in the individual plants. 2. Actual firing with careful observations as to effects and results. 3. Instruction as to changes which should be made in the condition and operation of the plants visited. 4. Direct personal instruction to the individual firemen relative to the introduction of coal, air, steam, etc., to his furnace so as most effectively to reduce smoke.

Schaefer Mfg. Company's Reorganization

The Schaefer Mfg. Company, builder of blast furnaces, stand pipes, general structural work, etc., Birmingham, Ala., has undergone important changes in its management. John V. Schaefer, who has been the operating head of the company, has retired, being succeeded by John N. Coffin as president and general manager. Mr. Coffin has been assistant treasurer of the Tennessee Coal, Iron & Railroad Company for the past five years, but had an active and wide experience in engineering and construction work and as executive in large commercial and manufacturing enterprises before going to Birmingham. Associated with Mr. Coffin in the new board of directors are W. P. G. Harding, president First National Bank; H. C. Ryding, assistant to the vice-president of the Tennessee Company; Walker Percy and L. T. Beecher. Mr. Coffin will hereafter devote his entire time and attention to the Schaefer Company, and has under advisement important plans for strengthening its financial resources, for the improvement of its plant at North Birmingham and for the development and expansion of its business.

The South Bend Tribune, of January 23 gave a most interesting report of the dinner on the previous evening at the Hotel Mishawaka, at Mishawaka, Ind., by the branch managers and heads of departments of the Dodge Mfg. Company. The committee in charge of the dinner was styled "the conspirators." They performed their work splendidly, developing a fresh surprise with every course. General Sales Manager D. J. Campbell acted as manager of ceremonies. Toasts were responded to by S. W. Schuyler, second vice-president; W. E. Galway, Cincinnati; Charles Endlich, secretary-treasurer; E. S. Grant, Philadelphia; W. B. Hosford, vice-president; Thomas L. Rose, Pittsburgh; C. F. O'Brien, St. Louis; E. M. Kenyon, Chicago; E. H. Ahara, general superintendent; J. T. Dickinson, Boston; S. L. Dickey, Atlanta; S. A. Emery, New York; M. W. Mix, president.

Foundry Iron Prices at Cincinnati and Chicago

A Record of 37 Years on Southern Foundry Iron at Cincinnati and 25 Years on Local Iron at Chicago

So much interest is being taken in statistics of prices for a long series of years that we have no doubt many of our readers will attach much value to the tables given below, showing average monthly prices of No. 2 Southern foundry pig iron at Cincinnati from 1876 to 1912, inclusive, and No. 2 local foundry pig iron at Chicago from 1888 to 1912, inclusive. These prices are averaged from weekly quotations in the market reports of *The Iron Age* and are per ton of 2240 lb.

Southern No. 2 Foundry Pig Iron at Cincinnati, per Gross Ton

	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887
January	$22.00	$20.00	$18.00	$17.10	$37.75	$22.50	$25.50	$21.62½	$17.25	$15.62	$17.00	$26.12
February	22.00	20.25	18.00	17.75	41.12½	22.50	25.50	21.50	17.00	15.25	17.00	21.00
March	22.00	20.40	17.62½	18.00	38.12½	22.50	24.90	20.60	17.75	14.62	17.00	21.00
April	22.00	20.50	17.75	18.00	33.50	22.50	23.50	20.62½	17.87	15.15	17.00	21.00
May	22.00	20.20	17.00	18.00	26.25	22.25	23.00	20.25	17.25	15.00	16.37	20.50
June	20.00	20.25	16.25	17.75	23.25	22.00	22.00	19.50	17.25	15.25	16.12	19.40
July	20.00	19.25	16.00	17.75	22.60	21.50	22.25	19.00	16.62	14.81	15.37	19.50
August	20.00	18.00	16.20	19.50	24.00	21.50	22.60	18.50	16.00	14.87	15.25	20.00
September	19.50	18.00	16.75	25.50	24.00	21.75	22.62½	18.50	15.87	15.00	16.75	20.00
October	19.50	18.00	17.00	33.50	23.50	22.00	22.37½	18.50	16.25	15.00	17.00	19.75
November	20.00	18.00	17.00	36.00	22.00	24.50	22.00	18.50	16.18	15.50	17.75	19.50
December	20.10	18.00	17.00	35.00	22.25	25.00	22.00	18.37½	16.25	16.37	18.60	18.87

	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899
January	18.62	14.75	18.05	13.81	13.75	12.50	11.00	9.25	11.20	11.00	9.50	10.31
February	19.00	14.37	17.75	13.75	13.62	12.12	10.75	9.25	11.00	9.75	9.25	11.69
March	18.50	14.50	16.00	14.00	13.10	12.00	10.20	9.25	10.75	9.69	9.25	13.75
April	17.75	14.25	14.31	13.75	13.00	11.75	9.50	9.25	10.40	9.25	9.25	14.50
May	16.75	14.00	14.25	14.00	12.81	11.68	9.50	9.50	10.50	8.75	9.37	14.56
June	15.75	13.68	14.75	13.75	12.81	11.50	9.61	10.12	10.32	8.75	9.30	16.00
July	15.50	14.12	14.75	13.75	12.40	11.37	9.75	11.50	9.75	8.95	9.25	17.56
August	15.80	14.50	14.75	13.50	12.17	11.05	9.80	11.50	9.37	9.00	9.37	18.33
September	16.50	14.50	14.25	13.50	12.00	10.75	10.00	12.75	9.50	9.35	9.55	19.94
October	16.50	15.31	14.25	13.75	12.25	10.75	10.00	12.75	9.95	9.50	9.75	20.75
November	15.65	16.62	14.25	14.00	12.50	10.75	9.75	12.75	10.44	9.50	9.75	20.75
December	15.50	17.56	14.00	13.75	12.50	10.87	9.25	12.50	10.35	9.50	9.90	20.75

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
January	20.69	13.45	14.55	21.65	12.37	16.25	16.75	26.00	16.15	16.25	17.25	14.25	13.25
February	20.50	13.12	14.75	21.50	12.12	16.25	16.75	26.00	15.75	16.13	17.06	14.25	13.31
March	20.30	14.00	14.75	21.37	12.10	16.25	16.65	26.00	15.50	15.05	16.30	14.25	13.50
April	20.19	14.50	16.87	20.15	12.50	16.25	16.63	25.06	15.20	14.25	15.37	14.25	13.75
May	19.75	13.85	18.35	18.87	12.25	15.81	16.75	24.25	14.75	14.50	15.00	13.95	14.15
June	18.75	13.37	20.19	17.75	11.80	14.65	16.44	24.10	15.25	14.70	14.85	13.44	14.25
July	16.81	13.00	20.75	16.15	11.81	13.94	16.06	23.85	15.00	15.75	14.75	13.25	14.70
August	14.25	13.00	23.06	15.19	12.00	14.40	17.30	23.00	15.25	16.38	14.31	13.45	15.06
September	13.62	13.06	25.00	14.75	12.00	14.37	18.69	21.50	15.65	17.35	14.25	13.31	15.87
October	12.87	13.75	25.65	13.50	12.81	15.31	20.00	20.95	15.75	17.88	14.25	13.25	16.80
November	12.95	14.00	23.62	12.00	15.19	16.60	23.38	19.50	16.00	17.75	14.25	13.20	17.25
December	13.75	14.25	22.44	12.05	15.85	16.75	25.00	17.00	16.25	17.45	14.25	13.19	17.25

Local No. 2 Foundry Pig Iron at Chicago (at Furnace after 1907), per Gross Ton.

	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899
January	19.00	16.00	19.50	14.60	14.50	13.37	12.50	9.75	13.55	11.02	11.35	11.47
February	18.87	15.00	18.87	15.00	14.37	12.81	11.87	9.75	12.50	11.00	11.28	12.47
March	18.12	15.00	17.62	15.00	14.00	13.00	11.30	9.81	12.00	10.88	11.10	14.95
April	17.50	15.00	16.62	15.12	14.00	13.00	10.50	10.25	12.00	10.75	11.26	15.47
May	17.00	15.00	16.20	15.00	14.00	12.96	10.50	10.25	11.69	10.38	11.35	15.72
June	16.25	14.50	16.00	15.00	14.00	13.00	10.50	10.88	11.50	10.25	11.35	17.95
July	16.00	14.87	16.00	15.15	14.00	12.79	10.12	12.13	11.25	10.25	11.35	19.22
August	16.00	15.10	16.00	15.00	13.75	12.75	10.00	13.20	11.18	10.25	11.35	20.65
September	16.50	15.50	16.00	15.00	13.50	12.75	10.00	13.63	10.75	10.40	11.35	22.22
October	17.12	17.00	16.00	15.00	13.50	12.75	10.00	14.00	10.88	11.00	11.35	23.35
November	17.00	17.62	15.75	14.94	13.50	12.75	9.70	14.00	11.19	11.00	11.35	23.45
December	16.87	18.66	15.37	14.62	13.50	11.69	9.75	14.00	11.25	11.00	11.35	23.85

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
January	23.85	15.10	16.25	23.45	14.47	17.85	19.60	25.85	18.45	17.35	19.00	15.50	14.00
February	23.85	14.60	16.85	23.35	13.91	17.85	19.41	25.85	18.16	16.75	19.00	15.50	14.00
March	23.85	15.60	18.51	23.22	14.05	17.80	19.35	26.10	17.85	16.50	18.30	15.50	14.00
April	23.72	15.85	18.97	22.87	14.35	17.60	19.10	26.35	17.73	16.50	17.50	15.00	14.00
May	22.65	15.85	20.85	20.72	13.85	17.60	18.90	26.85	17.63	16.50	17.06	15.00	14.50
June	20.72	15.35	21.85	19.85	13.70	17.00	18.54	26.60	17.73	16.50	16.75	15.00	14.50
July	18.60	15.35	21.60	18.25	13.60	16.47	18.60	25.55	17.55	17.00	16.56	14.87	14.70
August	16.25	15.35	22.10	17.22	13.60	16.60	19.45	24.85	17.35	17.13	16.50	14.50	15.37
September	15.35	15.35	23.35	16.41	13.85	16.60	20.16	24.10	17.05	18.70	16.40	14.50	16.00
October	14.85	15.10	23.35	15.70	14.10	17.66	21.48	22.45	16.85	19.00	16.06	14.46	17.00
November	14.85	15.23	23.35	15.10	15.98	19.15	24.70	20.66	17.10	19.00	16.00	14.09	17.75
December	15.10	15.85	23.35	14.81	16.95	19.60	25.85	18.80	17.35	19.00	16.00	14.00	18.00

The Cincinnati prices given above date back to the earliest period for which Southern pig iron quotations are available at that point. It may be said that these quotations represent almost the beginning of the Northern business in pig iron coming from the vicinity of Birmingham, Ala.

The Chicago prices also represent quotations from the beginning of the production of pig iron in the vicinity of Chicago for the merchant trade. For a long time these prices were quoted delivered on track near Chicago foundries, but beginning in 1908 prices were figured at the furnace, from which at that time a switching charge to local foundries of about 35 cents per ton applied. At the present time the switching charge averages about 50 cents.

Connellsville Coke Prices for Thirteen Years

We present below tables showing monthly prices of prompt shipment Connellsville furnace and foundry coke for 13 years, 1900 to 1912, averaged from weekly quotations in *The Iron Age*.

Average Prices of Prompt Connellsville Furnace Coke, per Net Ton at Oven

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
January	$3.37½	$1.75	$2.90	$5.00	$1.60	$2.46	$2.62½	$3.53	$1.92	$1.59	$2.55	$1.40	$1.82
February	3.00	1.75	2.50	5.00	1.52½	2.56	2.14	3.50	1.86	1.59	2.12½	1.45	1.78
March	3.55	1.90	2.87½	5.00	1.65	2.43	2.24	3.02	1.72½	1.60	2.00	1.55	2.12½
April	3.56	2.00	2.50	4.20	1.60	2.07½	2.45	2.72½	1.57	1.60	1.77½	1.59	2.39
May	3.00	2.00	2.50	3.50	1.50	1.87½	2.46	2.16	1.50	1.57½	1.66	1.50	2.28
June	2.75	1.87½	2.69	3.00	1.45	1.82	2.32½	1.89	1.55	1.52½	1.65	1.42	2.02
July	2.37½	1.75	3.00	2.50	1.45	1.81	2.51	2.40	1.57½	1.58	1.59	1.44	2.21
August	2.00	1.75	3.87½	2.25	1.45	1.80	2.76	2.62	1.50	1.66	1.57	1.46	2.21
September	2.00	1.75	5.00	2.20	1.45	2.10	2.85	2.82½	1.50	2.39	1.60	1.50	2.37½
October	2.00	1.77	8.00	1.90	1.47½	2.61	2.84	2.85	1.53	2.76	1.59	1.50	3.41
November	2.00	1.95	6.00	1.75	2.04	2.95	3.13	2.41	1.72½	2.74	1.50	1.52	3.94
December	1.87½	2.14	6.00	1.62½	2.12½	2.79	3.52½	2.06	1.82	2.67	1.44	1.60	4.00

Average Prices of Prompt Connellsville Foundry Coke, per Net Ton at oven

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
January	$3.50	$2.25	$3.17	$6.50	$2.18	$2.38	$3.42	$4.25	$2.45	$2.00	$2.90	$1.90	$1.97½
February	3.31	2.31	3.50	6.50	2.10	2.68	2.65	4.00	2.39	1.95	2.70	2.10	2.09
March	4.10	2.50	3.50	6.50	2.25	2.75	2.78	3.65	2.25	1.95	2.60	2.05	2.56
April	3.75	2.50	3.12½	5.50	2.15	2.70	2.95	3.31	2.22	1.86	2.45	2.00	2.69
May	3.15	2.50	3.15	4.50	2.00	2.55	2.81	3.00	2.03	1.85	2.20	1.81	2.58
June	3.06	2.37½	2.87½	3.50	1.90	2.40	2.65	3.00	2.00	1.80	2.17	1.76	2.40
July	2.81	2.25	3.20	3.25	1.80	2.35	2.79	3.00	2.00	2.00	2.15	1.82½	2.40
August	2.70	2.25	4.25	3.00	1.75	2.25	3.00	3.08	1.92	1.95	2.15	1.85	2.40
September	2.31	2.25	6.00	2.87½	1.85	2.50	3.19	3.20	1.90	2.55	2.12	1.85	2.54
October	2.25	2.25	9.00	2.87½	2.00	3.00	3.31	3.25	2.10	2.90	2.10	1.81	3.65
November	2.25	2.31	7.00	2.50	2.25	3.50	4.00	2.75	2.20	3.25	2.05	1.85	4.25
December	2.25	2.39	7.00	2.25	2.35	3.50	4.12½	2.50	2.25	3.20	1.97	1.90	4.50

Attention should be called to the peculiar conditions prevailing in the coke market in the last half of 1902 and the first half of 1903. In all this period coke prices were seriously affected by the extraordinary demand for coke caused by the scarcity of anthracite coal resulting from the great strike of anthracite coal miners which began in the spring of 1902 and was not settled until late in that year. For several months blast furnaces and foundries were greatly hampered in their operations by inability to secure a regular supply of fuel. Prompt furnace and foundry coke at this time sold as high as $11 per ton at oven and it is possible that even a higher price may have been realized. Blast furnaces were often banked for a week or two awaiting coke deliveries, and many foundries ran intermittently. Coke was imported to some extent for the use of blast furnaces and foundries located near the seaboard, and foundry coke was shipped all the way to Chicago from Colorado. The quotations which are above given for this period are therefore to be regarded as to some extent conjectural.

Malleable Bessemer Pig Iron Prices at Chicago

The table below shows monthly prices of malleable Bessemer pig iron at Chicago from 1900 to 1912 inclusive, averaged from weekly quotations in *The Iron Age*, per ton of 2240 lb.

Average Prices of Malleable Bessemer Pig Iron at Chicago per Gross Tons

	1900	1901	1902	1903	1904	1905	1906	1907	1908*	1909	1910	1911	1912
January	$25.00	$15.00	$17.20	$23.24	$14.50	$17.50	$19.37½	$26.00	$18.60	$17.08¾	$19.00	$15.50	$14.35
February	25.00	14.87½	17.75	23.00	14.50	17.50	19.18¾	26.00	18.25	16.75	19.00	15.50	14.14
March	25.00	15.75	18.50	22.87½	14.00	17.50	19.00	26.25	17.50	16.50	18.40	15.50	14.00
April	24.25	16.50	19.50	21.82	14.00	17.50	18.77½	26.50	17.50	16.50	17.50	15.25	14.00
May	23.40	16.45	21.80	20.77½	14.00	17.37½	18.35	26.60	17.56¼	16.66¼	17.06¼	15.00	14.40
June	21.12½	16.25	22.00	19.50	13.85	16.65	18.00	26.25	17.37½	16.50	16.75	15.00	14.50
July	19.50	16.25	22.75	18.66	13.75	16.37½	18.37½	25.62½	17.50	16.90	16.36¼	15.00	14.50
August	17.50	16.30	23.00	17.58¾	13.75	16.50	18.95	24.80	17.50	17.12½	16.50	14.80	15.10
September	16.12½	16.00	24.00	16.93¾	13.50	16.56¼	20.12½	24.40	17.26½	18.50	16.40	14.50	16.25
October	14.81¼	15.75	23.90	16.25	13.75	17.37½	21.32½	22.40	17.00	18.50	16.06¼	14.50	17.10
November	14.62½	15.81¼	23.87½	15.00	15.87½	19.00	24.16	20.25	17.00	19.00	16.00	14.35	17.87½
December	15.00	17.00	24.00	14.50	16.50	19.50	26.00	18.75	17.00	19.00	16.00	14.35	18.00

*From this time on the prices are given as at furnace near Chicago, and 35c. to 50c. per ton should be added to get the price delivered to Chicago foundries.

Mahoning and Shenango Foundry Iron Prices

In the following table are presented the monthly average prices of No. 2 foundry pig iron at Valley furnace, namely, at furnaces in the Mahoning Valley, Ohio, and the Shenango Valley, Pennsylvania, averaged from weekly quotations in *The Iron Age:*

Foundry No. 2, Valley Furnace, Per Gross Ton

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
January	$21.50	$13.20	$15.60	$22.30	$13.00	$16.12½	$17.31¼	$24.60	$16.80	$15.43¾	$17.00	$13.75	$13.00
February	22.03¾	13.16¼	16.20	21.95	12.47½	16.00	17.25	24.12½	16.00	15.06¼	16.68¾	13.75	13.00
March	22.10	13.97½	17.76¼	22.00	12.91	16.00	17.12½	24.00	15.56¼	14.50	16.10	13.75	13.12½
April	21.26¼	14.10	19.30	20.98¾	13.01¼	16.00	16.50	24.00	15.15	14.00	15.62½	13.75	13.25
May	20.30	14.10	19.92½	20.32½	12.46⅔	15.55	16.30	25.00	14.87½	14.18¾	15.31¼	13.75	13.25
June	17.91¼	13.66¼	20.60	19.37½	11.96	14.81¼	16.18¾	25.12½	15.00	14.90	14.75	13.56¼	13.25
July	16.28¾	13.20	21.10	18.01⅔	11.67½	14.25	16.43¾	22.80	14.80	15.18¾	14.31¼	13.50	13.37½
August	14.42½	12.97½	22.35	16.33¾	11.87	14.15	17.71	22.50	14.50	15.31¼	14.15	13.50	13.68¾
September	13.16¼	13.10	22.30	14.98⅓	11.71¼	14.56¼	19.56¼	20.87½	14.47	15.75	13.75	13.43¾	14.43¾
October	12.85	13.60	22.16⅔	14.08¾	12.50	15.50	21.35	19.80	14.36¼	17.12½	13.93¾	13.37½	16.10
November	13.35	14.41¼	23.25	13.31⅔	14.60	16.83	23.87½	19.00	15.25	17.25	13.90	13.20	16.93¾
December	13.03¾	15.20	21.25	13.22	16.18¾	17.35	24.00	17.37½	15.50	17.00	13.75	13.00	17.25

Foreign Visitors in American Plants*

A Pledge of Reciprocity Suggested as a Condition of Free Access—Views on Both Sides of the Question

BY RICHARD MOLDENKE

Those of us whose duties bring with them much correspondence from over the ocean, and who get to know many of the good people there personally, naturally are the recipients of introductory letters presented by foreign gentlemen who are desirous of visiting our advanced institutions and establishments. The secretaries of associations naturally come in for most of these requests, and as the industrial countries of the world are constantly enlarging their respective fields of activity, there is an increasing tide of foreign visitors coming to our shores to study our industrial conditions and advancement. So far these visits have been very one-sided, our people being too busy to look for themselves to find what foreign nations are doing. We are, however, beginning to awake in this direction and it looks as if a greater business acumen is being displayed in our foreign relations on commercial and governmental sides. We are noting with concern that the advantages of industrial and continuation schools in their ultimate effects on foreign commercial development have all been gathered by European countries, and we are badly handicapped in extending our energies outside of our tariff wall.

The writer remembers very vividly while walking in the streets of Chihuahua, Mexico, being stopped by a gentleman who remarked in German, "Well, you are the forty-third. Welcome to our city." There were forty-two German business men there, who practically controlled the wholesale as well as much of the retail business of the entire province. On being informed in his own language that your secretary was a good American-born citizen, with Wisconsin as his native state, and that though an admirer of all that is good in German character and achievement, he considered himself lucky to be born under the Stars and Stripes, this good German was much disappointed, but friendly just the same. The incident will show how keen is the foreign business man and how clannish he very naturally is, considering his training and traditions.

When pushing into the markets of the world, the foreign manufacturer can give us any number of points. He starts modestly. He sees what others with whom he may likely have to compete are doing—hence his visit to our works. His government aids him in every way—even with bayonets in remoter regions. Ship subsidy, consular service, trained experts sent quietly looking for openings everywhere. Once he has established himself, adjusting himself to the customs of the country—even marrying into the best families—his trade cannot be displaced even by better lines of goods from us. This is right and proper, and if we do not profit by such experience, it is up to us.

The Practice of Foreign Manufacturers

Now, however, that our manufacturers are waking up, they also want to see what the nations which have captured trade that, commercially speaking, should come our way are doing. And when they go to the other side they find fine people, but by no means the open door that characterizes us here for the most part. The European manufacturer, with few exceptions, is used to a narrower way of doing business. He must consider the pros and cons of a line of policy much closer than we, and hence very frequently his decision not to admit a visitor, even if the refusal is given in the most charming manner. It may be remarked parenthetically here that we have plenty of manufacturers—particularly in the chemical and metallurgical industries—who are just as close as they are in Europe. Investigation of the history of these plants will usually show European born proprietors and European trained technical staffs as having outlined existing policies. The American is by nature hospitable in the extreme. He also knows that if he has something new, the visitor is not usually in position to pull down his plant and rebuild on the improved lines he may see. If the American is wise, he will welcome his European visitor and discuss points of practice with him. Both will be the gainers thereby. Those of our members who have received foreign visitors with letters coming from this office will have noticed that reference is made to the specialty the visitor is expert in, and that it is advised to take advantage of this. Further, of recent times these letters have contained the clause that the visitor has expressed his willingness to extend reciprocal courtesies in his own plant. On this hangs the purpose of this pamphlet.

Reciprocity a Stipulated Condition

Knowing the disinclination of foreign manufacturers to open their plants to visitors, several gentlemen, friends of your secretary, who also receive numerous foreign visitors with letters of introduction and are expected to open the doors of American shops for them, have for some time insisted upon the promise of reciprocal courtesies before giving the necessary credentials. Your secretary has many times, in meeting the prominent manufacturers of the country, listened to bitter complaints on the lack of reciprocity existing in this respect, and hence when one of our greatest manufacturing corporations, members of our association, desiring to build new works here and wishing to study the latest advances in the art, sent a commission to the other side—armed with letters from this office and elsewhere—and found the doors closed to them, your secretary thought the time about ripe to ask for concerted action looking toward a uniform method of helping the foreign visitor to see here what he wants to when he is willing to reciprocate, and help keep him out when he declines so to act. In plain language, to help the industrial gentleman, and to keep out the industrial pirate.

The consequence was that the following circular letter was addressed to the offices of 52 societies of an industrial and technical nature, whose secretaries were thought to be somewhat in the position your own was.

Secretary Moldenke's Letter

WATCHUNG, NEW JERSEY, JULY 1, 1912.

To the Secretaries of Our Engineering and Technical Societies:

Greeting:—The undersigned, Secretary of the Foundrymen's Association, respectfully requests your kindly consideration of the following situation, and would be indebted to you for advice on what might be the best method of handling the matter in an effective way.

For many years representatives of the European iron and other interests have been coming over to this country, accredited to many of our secretaries of engineering and technical associations. They have been well received, been given letters of introduction to the advanced establishments and show places of the country. They have found the doors open, information freely given, have gone home loaded with blue prints, sketches, figures, etc., and have consequently made a trip to America, to study its industries and development, a big feature in the business education of our foreign industrial brethren.

The writer may say that for a dozen years he has thus received from one to a dozen people monthly and sent them on rejoicing. He was always glad to exchange information on technical and commercial questions, and has made many warm friends on the other side of the world.

The other side of the story is, however, not so pleasant. On occasion, our American friends ask us for letters to the other side. They also want to see what is doing. We give them introductions to the secretaries of associations similar to ours, and these gentlemen, realizing the situation, do their best to open the doors of industrial establishments for American visitors. The success of this endeavor is nearly always problematical, and the result is that foreign visitors become fully informed concerning our progress, and we get left.

A peculiarly aggravating experience on the part of the

*Issued as a report to the members of the American Foundrymen's Association, of which Dr. Moldenke is secretary.

representatives of one of our leading industrial establishments—the doors of which have always been open wide to foreign visitors—when in Europe a few weeks ago, is the direct cause of this circular letter. The following course of action is respectfully recommended for your consideration, and advice will be gratefully received.

1. To obviate the clerical labor involved in getting out a series of letters of introduction to applicants from other countries intending to visit our establishments (supposing them to have been properly accredited to us in the first place) but one general letter of introduction to be given, this to be retained by the holder until he finishes his tour.

2. No general letter of introduction to be given unless the applicant brings with him an official assurance that the European establishment he represents will be open to inspection for American visitors in return.

3. That letters accrediting visitors to our societies should come preferably through the secretaries of our European sister societies.

In view of the disagreeable experience of Americans in search of information in Europe, in return for courtesies extended here, the writer deems it a matter of justice to our industrial life that a fixed rule be adopted by us to care for this problem. It seems to be necessary to broaden the policy of European industrial establishments in this direction, and this can be done in no better way than to insist upon reciprocity.

Will you therefore kindly let the writer know whether you coincide with the above suggestions, or would modify the plan proposed? Also whether you approve of giving the matter sufficient publicity to make it effective? The writer would gladly undertake this if found desirable.

This circular letter goes to the offices of 52 societies which should have the same problem to meet.

Cordially yours,

RICHARD MOLDENKE, *Secretary*.

Action by Engineering Societies

Among the replies a few will be given in part, to show sentiment prevailing. Beginning with those who approve:

From a large engineering society:

. . . The board of direction discussed this matter . . . indorses the course of action you propose and stands ready to cooperate with you in securing the same courtesies to American visitors in Europe that are extended to Europeans visiting this country.

From another large engineering society:

I am further requested to advise you that the members of the board agree in general with your ideas as presented in your letter.

From a national engineering and industrial society:

The secretary was instructed to issue such letters of introduction only to applicants who are prepared to present official assurances that the European establishments which they represent are willing to reciprocate such courtesies by the admission of American visitors to their works.

From another national engineering society:

The board agreed that we would follow as closely as possible the stipulations you suggest.

Two other large engineering societies have approved of suggestion No. 2 of the letter in question, as best calculated to solve the problem.

All the above are board actions, the secretaries having presented the circular letter. In addition perhaps a dozen letters came from the secretaries of societies who did not think it necessary to present the matter to their governing bodies, but who heartily indorsed the suggestions and desired to learn the result of the inquiry and hoped for a standard form of letter which could be used for the constant requests they were receiving.

Now the other side. From a society of Foreign-American engineers:

. . regret not to be able to take the matter up.

For which we certainly cannot blame them. The letter of your secretary was sent, however, in a spirit of fairness to foreign technical men residing in this country, so that there might be no misconception on the subject. The secretary of that society also wrote quite an extended discussion showing that we were just as bad over here—and for his particular industry he was right, for not so long ago it was a life and death struggle for existence between the European and American industries, as the competition was so keen. And probably that is the reason why in some lines of industry, notably the machine building trade, where patents and the tariff give monopoly, and inventive progress is so rapid that every one here and abroad can afford to keep his shop open to visitors, there is no issue whatever existing. On the other hand, that much bitterness is present is shown by another letter received in which the writer says: . . . "and refuse absolutely to allow them the privilege of learning to conduct a similar business without having to go to the expense of . . ."

An Opposing View

As the crowning instance of an extreme view in opposition to your secretary's request, and to enable our membership to judge for themselves whether the request was fair or not, the following editorial in the American Machinist of October 17, 1912, is given in full:

A MISGUIDED REQUEST.

A short time ago the secretary of one of the large manufacturers' associations of the United States addressed a letter to 52 engineering and technical societies in regard to foreign shop visitors. He draws two pictures:

The first shows the open-armed cordiality with which the American manufacturer receives his foreign brother, the manner in which the visitor is given information and the way in which he is sent home rejoicing, "loaded with blue-prints, sketches, figures, etc." The second is in strong contrast and pictures the American visitor asking for admission into a foreign shop only to "get left."

To meet this supposed situation, a course of action is suggested as follows:

(Here follow the three suggestions of the letter in question.)

This suggests concerted retaliation on the part of the great American engineering and technical societies under the guise of reciprocity.

Granting for the sake of argument that the alleged conditions exist in fact, we doubt the wisdom of any retaliatory tactics. The very spirit in which the association mentioned was conceived, and which is at the bottom of every association and society addressed, rebels at such a procedure. Mutual helpfulness has become the order of the day, and industry is now on too broad a scale to harbor any geographical distinction.

* * *

Those qualified to speak with authority will at once stamp as absolutely unwarranted any accusation, direct or implied, that our European industrial friends are not meeting us on even terms in this matter. Any attempt to overcome a general condition that is purely imaginary can result only in injury to all concerned.

There is such an abundance of evidence of a character that cannot be impeached, that the general European attitude toward American shop visitors is just as progressive and broadminded as our own, that any complaints to the contrary cannot be taken seriously. The mildest characterization of this amazing request is "misguided."

In Reply

Here again we have the point of view presented. Who are "those qualified to speak" in the mind of the editor who wrote the above? Those who visit about in industries where you may not copy what you see without having a patent suit, or those who have patiently for years helped along foreign visitors in the belief that they were promoting international courtesy and upholding the hospitable traditions of the American nation? Let it be said here that there is much that is not pleasant connected with this effort. At the recent Congress of the International Society for Testing Materials, many of us were asked for introductions to the establishments of the country—which we gladly and freely gave. To our delighted astonishment later on, we received official communications from the gentlemen and even from the ministers of their governments, thanking us for the courtesies extended. This is so rare that it deserves publication here. Your secretary only the other day assisted the president of one of Europe's large industrial establishments with letters of introduction, which had to be sent after him. They were used all right, but not even acknowledgment of their receipt was had. At least thanks could have been expected.

The writer of the above editorial charges your secretary with suggesting "concerted retaliation . . . . under the guise of reciprocity." He had thought that his habit of doing nothing under a guise, but hitting openly from the shoulder at all times, was pretty well known. However, whether "the mildest characterization of this amazing request is misguided" or not may be safely left with our membership. This much is certain, that whenever any one comes with a letter of introduction from this office, he will have first given assurances that his own establishment will reciprocate courtesies extended.

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Increase in Steel Making Pig Iron

The production of pig iron in the United States in 1912, as officially reported, was 29,727,137 gross tons, which is strikingly close to our estimate printed at the beginning of the year of 29,750,000 tons, being only 23,000 tons, or less than one-tenth of 1 per cent. under that estimate, which was based upon our monthly returns of coke and anthracite iron for five months of the second half of the year, with an estimate for December and an estimate of charcoal pig iron for the second half.

While the pig iron report thus furnishes no fresh information as regards the total tonnage, it segregates the production by grades to an extent; the production of Bessemer pig iron and of basic pig iron is given separately, while the production of ferromanganese and spiegeleisen combined is also reported. The full segregation into grades, including malleable, regular foundry iron, forge pig, etc., will be made later. The present figures permit a computation of what may be regarded as the foundry grades, since they comprise practically everything that is not specifically Bessemer, basic or manganese bearing metal. The production of "forge pig iron" amounts to only between half and three-quarters of a million tons, and a considerable part of this, perhaps over half, is used in foundries rather than in the puddling furnace. Hence in the table below "all other" is practically foundry grades of pig iron, including malleable and low grade iron:

United States Pig Iron Production, Gross Tons.

	1910.	1911.	1912.
Bessemer	11,245,642	9,409,303	11,667,656
Basic	9,084,608	8,520,020	11,394,477
Manganese metals	224,431	184,718	221,725
All other	6,748,886	5,535,506	6,443,279
Total	27,303,567	23,649,547	29,727,137

That 1912 gained in tonnage 25.6 per cent. over 1911 is not a striking fact, for 1911 was distinctly an "off" year, and 1912 has been considered a "good" year. Indeed, in the final analysis 1912 was probably not altogether as good a year as has been popularly assumed. That the best previous calendar year record, made in 1910, was broken by 8.9 per cent. in 1912 is far from startling, for in the history of the American iron industry the average gain from one year to the next has been close to the gain which is now shown, not for one year but for two years. When it is observed, furthermore, that the production in the first half of 1910 was in fact a shade greater than one half the average production in 1912, the claim of the latter year as a pig iron tonnage year is seen to rest upon technical rather than upon material grounds.

The most interesting thing about the 1912 statistics is the large increase they show in the production of steel making iron. So great was this increase that the production of all other grades, practically all foundry grades, as already suggested, showed a decrease, from 6,748,886 tons in 1910 to 6,443,279 tons in 1912, a loss of 305,607 tons, when the increase in total pig iron was 2,423,570 tons.

This was really not an actual loss in consumption, for stocks of foundry iron increased in 1910 and decreased in 1912 enough to make it certain that there was an increase in consumption, despite the decrease in production, but the increase was only a small one. A comparison covering a decade would show that the increase in foundry iron has been almost negligible, while the production of steel making iron has very

greatly increased. Sometimes it is suggested that the iron foundry is losing ground to the steel foundry, but this explanation is not adequate. We are dealing here with millions of tons, while the production of steel castings, with 1912 yet to be heard from, has not been shown to have reached a single million tons. The correct statement rather is that the casting is yielding to the rolled product, or that new uses are being found for the rolled product more rapidly than for the casting.

The production of Bessemer pig iron showed an increase from 1910 to 1912, but only a slight one and not sufficient to furnish any suggestion that the Bessemer industry is taking a new lease of life, for the 11,667,656 tons of Bessemer and low phosphorus iron produced in 1912 compares with a maximum—in 1906—of 13,840,518 tons. It seems improbable that the 1906 figure will ever be touched again. In the six years in which Bessemer pig iron decreased 16 per cent., basic pig iron has increased no less than 126 per cent. This more than doubling in basic pig iron occurred in a period in which the total production of pig iron increased less than 18 per cent.

Judged by experience, the production of Bessemer pig iron in 1912 would indicate a production of Bessemer steel ingots and castings of about 9,800,000 tons, and of acid open-hearth steel of about 1,250,000 tons.

An approximation of the production of basic open-hearth steel in 1912 is less easily reached, for the consumption of scrap relative to pig iron has varied greatly and the production of basic pig iron does not indicate closely the production of basic steel. In 1897 and 1898 the production of basic pig iron slightly exceeded one-half the production of basic open-hearth steel, and the proportion decreased continuously until in 1901 the steel furnaces seemed to be using on an average 40 per cent. pig iron and 60 per cent. scrap. Then the percentage of pig iron began to rise, and approximated 60 per cent. in 1909-10-11, though it decreased slightly during those years. At a 60 per cent. proportion, the production of basic open-hearth steel in 1912 would come out 19,000,000 tons, but the official statistics, which will appear shortly, may easily show a variation of half a million tons from this estimate.

Ground is furnished for an estimate, however, that the total production of steel ingots and castings in 1912, by all processes, slightly exceeded 30,000,000 gross tons, which is easily double the output of 1902, the banner year until 1905, with its 20,000,000 tons. The production of steel, as we have pointed out from time to time, has increased more rapidly than the production of pig iron.

The Scrap Trade Out of Line

A very unusual condition has existed in the scrap trade in the Pittsburgh and Mahoning and Shenango Valley districts for several months, and it is one that is out of joint with the present situation in pig iron and steel. Price records show that the price of heavy melting steel scrap has usually been about the same as that of basic pig iron, with short periods in which it has been higher than basic. Taking the maximum price of basic iron to-day as $16.50, Valley furnace, or $17.40, Pittsburgh, the market on steel scrap is $3 a ton lower than basic iron, being about $14.50 per gross ton at Pittsburgh.

There are several reasons for this wide difference. The main one is that in September and October of last year, nearly all leading consumers of scrap bought very heavily for delivery through the winter months, anticipating that if there should be a great deal of snow and cold weather, deliveries by the railroads would be bad and they would be caught short of old material. As a matter of fact the mild weather has allowed the railroads to move cars freely and there has been little interruption of traffic. Dealers have shipped scrap into the mills as fast as called for in contracts or faster, and as consumers evidently overbought they now find their yards gorged with material. Requests to suspend shipments have been numerous, and in some cases there have been railroad embargoes to important consuming points.

The consumption of scrap for some months has been extremely heavy, but at the same time consumers have been making scrap very freely, and in addition the railroads have been making heavy replacements of track equipment, and their monthly scrap lists to dealers and consumers have contained more material than for many months. Another factor has been the Interstate Commerce Commission's action last year. Finding that large numbers of cars loaded with scrap were being held up instead of being unloaded within the prescribed time of 48 hours, the commission gave notice that the holding of cars must cease or prosecution and fines would follow.

All these conditions have operated against the scrap trade and have steadily forced down prices, especially in steel making scrap. The open-hearth steel makers in the Pittsburgh and Valley districts have been taking advantage of the situation for several months by steadily increasing the amount of scrap used in their mixture and decreasing the amount of pig iron. The usual practice when prices of basic pig iron and heavy steel scrap are close together is to use an average of 70 to 75 per cent. pig iron and 30 to 35 per cent. scrap. Some concerns are now using 60 per cent. iron or less, and 40 per cent. scrap and upward, and in a few cases the pig and scrap mixture has been about equal. The increased use of scrap to the displacement of basic pig iron is partly responsible for the present light demand for the latter, which is duller than for some time. At present no relief seems to be in sight for the scrap trade, consumers showing no inclination to contract ahead on the present prices, which are altogether in the buyer's favor. Stocks of scrap now in the yards of consumers and dealers are the heaviest in the history of the trade.

The Physician as a Factory Employee

An interesting development has been taking place in the operating staff of the large industrial establishment in the inclusion on that staff of a physician as a permanent employee. The hospital room or the room set apart for ministering to injuries received by the employee has become a detail of the plant to be counted almost as essential as proper means of heating in winter. Hospital trained attendants, such as trained nurses, have also been a part for some time of the operating staff of a good many manufacturing plants. In short, works hospitals, occasionally noted in large factories some years ago, are now numerous enough not to excite comment. The most recent change seems to be that the physician who was identified with the manufacturing institution through a retainer is

being replaced by the physician who can be assigned a sufficient number of tasks to make his continuous service to the factory a practical arrangement.

Considerations surrounding the administration of workmen's compensation provisions and general liability responsibilities, even though not always in given localities subject to mandatory legislation, have made the expert on medicine and surgery an important member of the manufacturing plant. More scientific methods of selecting applicants for employment are giving the physician a work in a line allied to his strictly medical pursuit. Given the man with the scientific training, particularly if this has included the psychological as well as the anatomical or physical study of man, and couple this personality with a close knowledge of what is required of the employee in different departments, and it is reasonable to expect that a more rational method of hiring will result, and naturally to the advantage of both employer and employee.

Further, in the times when the doctor of the plant would not be engaged in taking care of the injured or in analyzing what is required of the worker, or in assisting in passing on applicants, advantageous use of his time could be made in investigating conditions in the shops. There are numerous things commonly unsatisfactory, such as the performance of the heating apparatus or lack of ventilation, from the physician's standpoint; or again, the methods of lighting in vogue, and in general the hygienic surroundings, washroom facilities and the like.

Undoubtedly the steady employment by a manufacturer of the doctor of medicine partakes a good deal of altruism. Certainly such an employee making good use of his time is calculated to add much to the fund of knowledge regarding shop hygiene. Certainly he is in a position to help immensely the State or municipal bureaus attempting to collate information on industrial accidents and industrial diseases. Similarly altruistic, the early provision of hospitals and trained nurses was regarded, but the latter, besides being evidence to the employees of consideration for their welfare, have actually proved decidedly beneficial as reflected in the profit and loss accounts. There is reason to believe that the present large use of the physician will similarly prove profitable on all sides. In this connection it is of interest to note the resolution presented last week at the Efficiency Society's convention urging medical schools to provide a course looking to specialization in industrial hygiene.

At midnight February 1 the new Grand Central Station of the New York Central in New York City was formally opened for regular use. The total area of the terminal is 79 acres. There are 42 tracks on the upper express level and 25 on the lower, or suburban level, with a total length of nearly 34 miles. In the excavation work 3,200,000 cu. yds. of material was removed, 2,000,000 of which was rock. The new station at the street level is 672 ft. long, 310 ft. wide and 150 ft. high. In all of the buildings and viaducts 118,000 tons of steel was used, and the concrete work consumed 500,000 barrels of cement. Warren & Wetmore are the architects.

The recently completed addition to the West Steel Casting Company's plant at Cleveland, Ohio, was occupied last week, the first casting being poured January 28. On February 1 the company's best record in melting was made —seven blows of 5000 lb. each.

Causes of the Scrap Glut at Chicago

An Unusual Situation Sends Prices Down Out of All Relation to New Material Values

CHICAGO, ILL., February 3, 1913.—A very unusual contrast, especially pronounced in the Chicago district, is presented in the low prices prevailing for scrap as compared with the very firm basis upon which new material is being held. Under normal conditions it has been customary in times past to consider No. 1 wrought scrap as worth approximately one-half the price of iron bars. More recently increased labor costs have added to the value of bar iron; but with bar iron firm at $32 per net ton and No. 1 railroad wrought going begging at $12.50 all relationship is for the time being lost.

Short periods of weakness or strength occur not infrequently in old materials, but the present decline of prices has been so prolonged as to call for other explanations than commonly apply. The market facts are obvious. More scrap has been offered and is now available than consumers have been able to handle conveniently into their yards, to say nothing of using. As to the cause for this outpouring of old material there has been some difference of opinion. There is no doubt that the high prices offered for scrap just before the present slump resulted in a heavy liquidation of scrap piles which had been held or accumulated by dealers throughout the country. The movement of this stock came first, and at a time when the railroads were offering exceptionally small quantities—that is, in the late summer and early fall months. Consumers themselves with their order books filling rapidly were largely responsible for advancing prices, because of their eagerness to cover for their requirements. Scrap dealers and brokers with the speculative viewpoint were anticipating sales and crowding shipments into the consuming centers. In the meantime the railroads began gathering their scrap. Some of it was offered on the market in the regular way, but the greater part was moved direct to the mills on exchange arrangements for bars.

There are those who attribute the congestion of the market to this latter class of material, much of which was bought quietly. Certainly a number of the larger dealers suddenly found themselves with scrap coming in from all directions and the melters to whom they had anticipated selling well supplied. The weather conditions have contributed to the free movement of scrap by the railroads, and improvements at the works of one of the large consumers have restricted track facilities and resulted in a large embargo, which has augmented the congestion.

A less common explanation, but one which points out a real factor in the situation, relates to the considerable amount of scrap being made by manufacturers for which there is no corresponding consumption by the makers of steel. An important manufacturer of bolts and rivets in this territory has for disposal in this market between 500 and 1000 tons of scrap monthly. The steel plant which supplies this company with bars buys practically no scrap in the market, or at least no quantity commensurate with the amount of scrap made in working up the products it sells. Some other mills must absorb this scrap; and after the lapse of a certain time during which miscellaneous manufacturing operations are at a high rate, the aggregate of scrap developing in the above manner comes to be an important factor.

The scrap situation, as it has been for several weeks and as it is in prospect, gives clear evidence that current production of old material is at a higher rate than consumption, and that the pressure of this excess as well as an unusual freedom in the movement of scrap is responsible for the steady decline.

A free night school has been opened at the plant of the American Car & Foundry Company, Jeffersonville, Ind., for employees who wish to improve their technical knowledge in mechanical drawing and blue print making.

Correspondence

The Buyer and the Seller

To the Editor: Your editorial on "The Buying Agent and the Honest Salesman" in the issue of January 23 is, to my way of thinking, very fair and good, and this I say after many years' experience on the road in all sections from coast to coast, and from Canada to the Gulf.

The purchasing agent should have a care, for in the long run his dominant characteristics are certain to be known to the selling fraternity. These itinerants are constantly crossing and recrossing each other's path. A typical traveling man is quick to spot a fellow knight of the grip on trains, boats and streets, in shops, hotels, etc., and is indifferent to the ceremony of formal introductions. Business is usually the paramount issue with salesmen, and their talk is very apt to include the buyers, especially if they visit the same trade. These comparisons of notes on buyers are often made with much freedom, in the assurance that no reputable commercial traveler would violate the unwritten code of the fraternity to treat each other's statements as confidential. In this way, I have heard all shades of characterization of buyers, such as "perfect gentleman," "straight as a die," "strictly on the level," etc. The worst I ever heard was "son of a bee, net."

In my travels I have had the good fortune to meet many very fine gentlemanly buyers—always courteous, fair and square, men that one could fully believe when they made an unqualified statement—and it is a pleasure now to recall meeting and knowing such people, whether they ever bought of me or not. The traveling salesman also has a long memory for the cold-blooded buyer; the curt reception after a long wait; the buyer with a grouch and a chronic skeptical spirit.

The purchasing agent should have in mind that salesmen are effective and extensive advertisers of his virtues or shortcomings; he should be familiar with the line from Kipling, "You bet that Tommy sees." Paradoxical as it may seem, I shall never forget a man whom I never met. My elegantly engraved card was handed to a boy through a window in the wall; it went into the back room and came back with the words scrawled on its face, "Nothing wanted." The provocation to send it back with three words was checked by remembering the injunction to "Cast not your pearls before"—certain types of quadrupeds.

The salesman also should have a care. He should always be good-natured, tactful, diplomatic, resourceful and never under any circumstances should he bore the buyer and forget the value of his time. He should be away up in his line and stick to his text while he has the buyer's ear. The latest good story can wait a more opportune time.

There is no doubt that the morale of the commercial traveling army has vastly improved since ante-bellum days and this might be cut down to the last decade or two. Now, the average traveling man can fairly be called a gentleman, in the best sense of the term. They are not all Gideons and none of them are "plaster saints," but in the main their habits are good, and they are smart enough to know that probity and square dealing are valuable assets for them to possess, commercially and otherwise.

I have heard discriminating buyers say that it paid them to talk with traveling salesmen whether they were in the market or not. The exchange of ideas between intelligent buyers and sellers is always mutually advantageous, and the buyer or seller who ignores or neglects the civilities and courtesies of commercial ethics probably loses the opportunity for a valuable and lasting investment.

B. F. T.

The Pennsylvania Railroad Company has placed contracts for 100 locomotives for its lines west, 70 going to the American Locomotive Company and 30 to the Baldwin Locomotive Works. These purchases are in addition to a contract for 65 locomotives the company placed two weeks ago. The Norfolk & Western has contracted for 40 Mallet freight locomotives with the American Locomotive Company.

American Institute of Mining Engineers

Important Iron and Steel Papers—A Symposium on "Sound Steel Ingots"

In the programme for the annual meeting of the American Institute of Mining Engineers in New York, February 18 to 21, all day Wednesday, February 19, is set apart for the consideration of papers on iron and steel. The following are on hand and in print:

"Valuation of Iron Mines," by J. R. Finlay.

"Notes on Cast Iron," by Albert Sauveur.

"Comparative Notes on Steel Rail Rolling," by Robert W. Hunt.

"New Design of Open-Hearth Furnace Using Producer Gas," by H. F. Miller, Jr.

"Why Does Lag Increase with the Temperature from which Cooling Starts?" by Henry M. Howe.

"Microstructure of Sintered Material," by B. G. Klugh.

"Blast Furnace Slag Analyses for 24 Hours," by F. Louis Grammer.

"Methods of Preparing Basic Open-Hearth Steel for Casting," by H. F. Miller, Jr.

About 100 men who are well informed on iron ore values have been selected in advance by Messrs. Finlay, Birkinbine and others and have been invited by the committee to study Mr. Finlay's paper and send in advance discussions, or to discuss it in person. So much interest has been evoked by the author's valuation of the Lake Superior mines that an interesting debate is expected. Several men selected by Mr. Sauveur, J. E. Johnson, Jr., and others have been invited to study the paper on cast iron in advance and prepare a discussion for the meeting. Requests are also being sent out for discussion on Captain Hunt's paper, which will, no doubt, attract many to the meeting. The second paper by Mr. Miller was received at the Cleveland meeting of the institute in November too late to be discussed. It is to be brought up at the coming meeting in response to requests.

In addition to the above, the Committee of the Iron and Steel Division will make one of the chief features of the day a symposium on the subject of "Sound Steel Ingots." The following papers dealing with this subject are on hand and will be in print for the meeting:

"The Production of Solid Steel Ingots," by Benjamin Talbot. Extensive discussion of this paper has already been contributed.

"Piping and Segregation of Ingots of Steel and Ductility," by P. H. Dudley.

"The Use of Anti-Piping Thermit in Casting Steel Ingots," by E. A. Beck.

These three papers describe new processes for making sound ingots. In addition, two other processes which are now being tested commercially but have never been publicly announced, will be described if the experiments upon them can be brought far enough along to warrant a report at this time. It is hoped that some of the prominent metallurgists of Europe will attend the meeting and take part in the discussion. Following the above papers a general discussion will be had of the subject of sound steel ingots on behalf of both producers and consumers of steel. It will be presented under the following topics:

1. Is the present method of getting rid of the pipe by cropping a safe and reliable device for making sound steel?
2. Is it desirable to increase the amount of metal arbitrarily cropped off the top of an ingot, and, if so, what would be a fair excess price to pay for cropping off 20 per cent.?
3. Is it commercially practicable to make ingots without pipes or blowholes, and what additional expense of manufacture would be justified to accomplish this result?
4. What process for making pipeless ingots seems the most promising of commercial success and why?

The discussion will be opened by engineers whose names are already prominent in this connection, and a large number of engineers of railroads and other consuming interests, and of steel makers and metallurgists—non-members of the Institute—have been invited to attend and enter the debate, in order that all sides of this question, which is probably the most important now before the steel public, may be adequately represented.

Charles Kirchhoff is chairman of the Committee of the Iron and Steel Division, C. F. Rand vice-chairman and Bradley Stoughton secretary.

Small Pig Iron Increase

January Production 2,795,000 Tons

The output of coke and anthracite iron in January was 2,795,331 gross tons, or 90,172 tons a day, as against 2,782,737 tons, or 89,766 tons a day in December. The gain of about 400 tons a day was about equally divided between steel works and merchant furnaces. While five more furnaces were in blast at the opening of this month than on January 1 the total active capacity was only about 400 tons a day more, the caliber of the furnaces blowing out being greater on the average than of those blowing in. The 298 furnaces in blast February 1 had a capacity of 91,328 tons a day against 90,901 tons a day for 293 furnaces on January 1.

In the list of furnaces blown in last month are No. 1 Susquehanna at Buffalo, Leesport in the Schuylkill Valley, Meily in the Lebanon Valley, Fannie in the Shenango Valley, Dora in Virginia, Struthers, Mary and Tod in the Mahoning Valley, Thomas in Wisconsin, Rockdale and Standard in Tennessee and one Hokendauqua in the Lehigh Valley.

Among furnaces blown out were Delaware River and one Worth in the Schuylkill Valley, one Eliza and one Monongahela in Allegheny County, New Castle No. 4 in the Shenango Valley, one Ashland in Kentucky and Jackson in the Hanging Rock district.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from January, 1912, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons.

	Steel works.	Merchant.	Total.
January, 1912	47,844	18,540	66,384
February	53,482	18,960	72,442
March	58,961	18,630	77,591
April	61,024	18,157	79,181
May	62,018	19,033	81,051
June	60,799	20,559	81,358
July	58,168	19,570	77,738
August	59,464	21,582	81,046
September	59,102	23,026	82,128
October	62,820	23,952	86,772
November	62,817	24,878	87,695
December	63,770	25,996	89,766
January, 1913	63,921	26,251	90,172

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in January and the four months preceding.

Monthly Pig-Iron Production—Gross Tons.

	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)
New York	161,223	179,726	169,677	184,899	188,943
New Jersey	5,693	5,370	6,167	5,609	5,833
Lehigh Valley	79,726	87,182	94,831	91,393	99,470
Schuylkill Valley	71,085	78,440	78,413	80,513	80,223
Lower Susquehanna and Lebanon Val.	65,604	61,480	60,313	66,161	72,172
Pittsburgh district	546,829	621,813	567,868	626,688	626,118
Shenango Valley	121,951	143,115	133,819	149,404	152,065
Western Penn.	142,669	157,027	160,134	163,473	163,563
Maryland, Virginia and Kentucky	42,896	42,286	49,140	58,526	61,026
Wheeling district	108,932	118,034	114,632	124,708	111,595
Mahoning Valley	243,906	256,711	242,952	245,691	259,756
Central and North Ohio	218,867	237,506	236,198	246,666	246,709
Hocking Valley, Hanging Rock and S. W. Ohio	30,279	38,419	39,231	38,108	29,247
Chicago district	365,115	388,650	398,678	411,213	402,408
Mich., Minn., Mo., Wis., Col., Wash.	77,902	76,774	75,697	84,190	83,750
Alabama	153,374	160,834	167,408	171,090	180,790
Tennessee	27,788	36,566	35,696	34,405	31,863
Total	2,463,839	2,689,933	2,630,854	2,782,737	2,795,331

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons.

	Pig. Total production			Spiegeleisen and ferromanganese		
	1911.	1912.	1913.	1911.	1912.	1913.
January	1,128,448	1,483,153	1,981,560	8,360	22,622	15,633
February	1,185,782	1,550,995	.....	12,821	15,950	.....
March	1,518,063	1,827,792	.....	11,784	11,538	.....
April	1,434,142	1,830,717	.....	10,657	11,104	.....
May	1,310,378	1,922,557	.....	13,641	20,518	.....
June	1,281,241	1,823,958	.....	22,611	26,685	.....
July	1,316,646	1,803,205	.....	17,067	26,522	.....
August	1,460,610	1,843,404	.....	14,579	24,225	.....
September	1,490,898	1,773,073	.....	17,757	22,484	.....
October	1,560,884	1,947,426	.....	19,697	27,252	.....
November	1,452,907	1,884,524	.....	19,678	17,461	.....
December	1,453,446	1,976,870	.....	20,068	18,523	.....

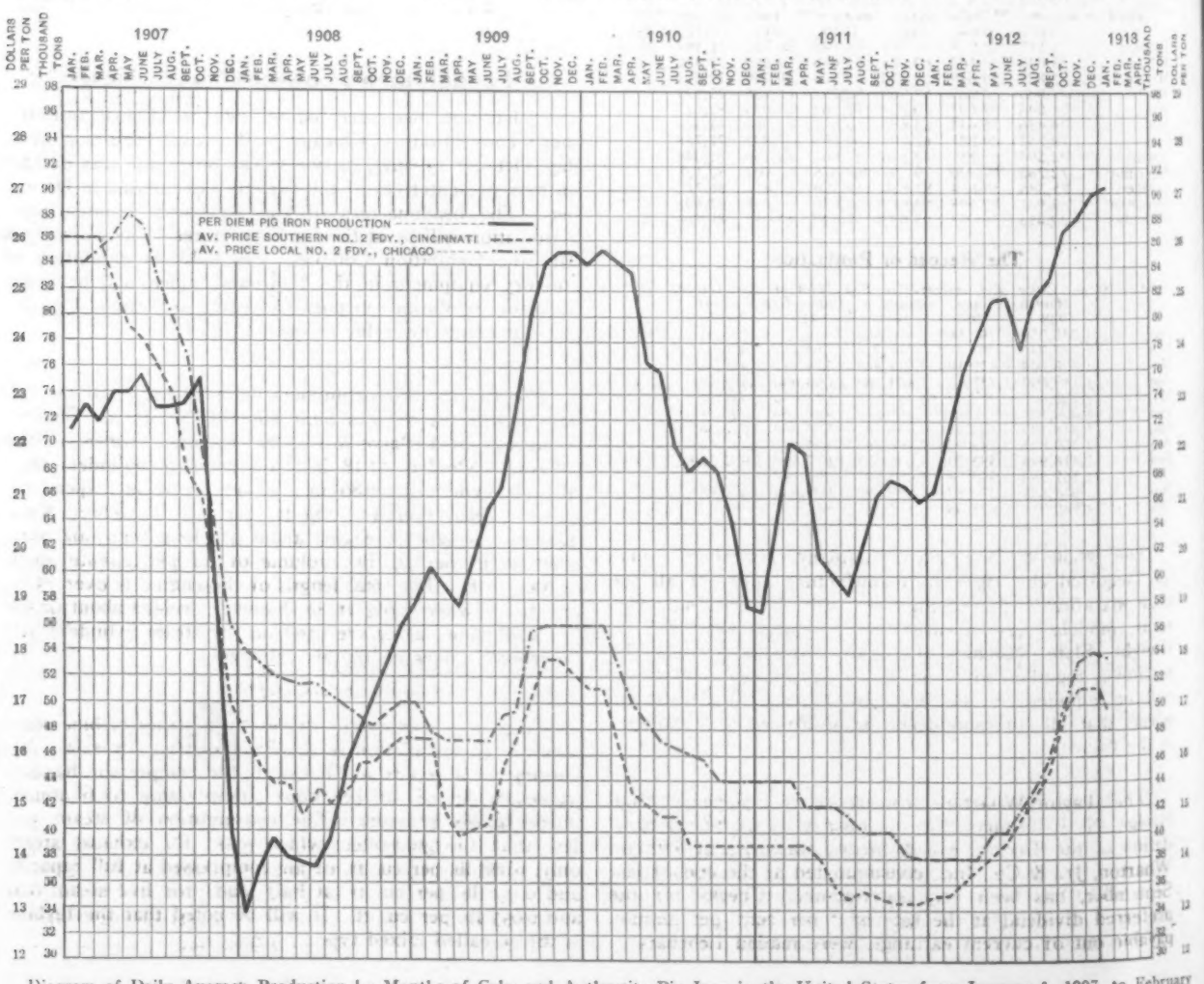

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to February 1, 1913; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Capacity in Blast February 1 and January 1

The following table shows the daily capacity, in gross tons, of furnaces in blast February 1 and January 1 by districts:

Coke and Anthracite Furnaces in Blast.

Location of Furnaces.	Total number of stacks.	Feb. 1 — Number in blast.	Feb. 1 — Capacity per day.	Jan. 1 — Number in blast.	Jan. 1 — Capacity per day.
New York:					
Buffalo	19	17	5,680	16	5,414
Other New York	7	3	582	3	551
New Jersey	7	1	188	1	181
Pennsylvania:					
Lehigh Valley	22	14	3,192	13	2,871
Spiegel	2	2	168	2	175
Schuylkill Valley	16	9	2,370	10	2,823
Lower Susquehanna	7	5	1,156	5	1,082
Lebanon Valley	10	9	1,225	8	1,175
Pittsburgh District	51	46	19,680	48	20,179
Spiegel	3	3	330	3	424
Shenango Valley	20	17	4,805	17	4,945
Western Pennsylvania	27	19	5,254	19	5,333
Maryland	4	3	812	3	645
Wheeling District	14	11	3,730	11	4,020
Ohio:					
Mahoning Valley	24	23	9,184	20	7,970
Central and Northern	24	21	7,958	21	7,957
Hocking Val., Hanging Rock & S. W. Ohio	15	8	1,055	9	1,165
Illinois and Indiana	34	32	12,981	32	12,974
Spiegel	2	0	0	0	0
Mich., Wis. and Minn.	10	9	1,863	8	1,707
Colorado, Mo. and Wash.	8	3	986	3	1,010
The South:					
Virginia	23	8	1,005	7	920
Kentucky	5	2	285	3	420
Alabama	46	24	5,792	24	5,880
Tennessee	20	9	1,047	7	900
Total	420	298	91,328	293	90,721

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.	1913.
January	71,149	33,918	57,975	84,148	56,752	66,384	90,172
February	73,038	37,163	60,976	85,616	64,090	72,442	.....
March	71,821	39,619	59,232	84,459	70,036	77,591	.....
April	73,885	38,289	57,962	82,792	68,836	79,181	.....
May	74,048	37,603	60,753	77,102	61,079	81,051	.....
June	74,486	36,444	64,656	75,516	59,585	81,358	.....
July	72,763	39,287	67,793	69,305	57,841	77,738	.....
August	72,594	42,851	72,546	67,963	62,150	81,046	.....
September	72,783	47,300	79,507	68,476	65,903	82,128	.....
October	75,386	50,554	83,856	67,520	67,811	86,772	.....
November	60,937	51,595	84,917	63,659	66,648	87,695	.....
December	39,815	56,158	85,022	57,349	65,912	89,766	.....

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1908—Gross Tons.

	1908.	1909.	1910.	1911.	1912.	1913.
Jan.	1,045,250	1,797,560	2,608,605	1,759,326	2,057,911	2,795,331
Feb.	1,077,740	1,707,340	2,397,254	1,794,509	2,100,815	.....
Mar.	1,228,204	1,832,194	2,617,949	2,171,111	2,405,318	.....
Apr.	1,149,602	1,738,877	2,483,763	2,064,086	2,375,436	.....
May	1,165,688	1,883,330	2,390,180	1,893,456	2,512,582	.....
June	1,092,131	1,930,866	2,265,478	1,787,566	2,440,745	.....
July	1,218,129	2,103,431	2,148,442	1,793,068	2,410,889	.....
Aug.	1,359,831	2,248,930	2,106,847	1,926,637	2,512,431	.....
Sept.	1,418,998	2,385,206	2,056,275	1,977,102	2,463,839	.....
Oct.	1,567,198	2,599,541	2,093,121	2,102,147	2,689,933	.....
Nov.	1,577,854	2,547,508	1,909,780	1,999,433	2,630,854	.....
Dec.	1,740,912	2,635,680	1,777,817	2,043,270	2,782,737	.....

The Noble & Westbrook Company, Hartford, Conn., has acquired the right to manufacture and sell all the slate marking machines, together with the drawings, patterns, models, jigs, fixtures, etc., formerly built by the Dwight Slate Machine Company of that city. The machines, together with any dies or attachments for them, will be supplied by the first-named company, which requests that all correspondence be addressed to it directly in the future.

The Taylor-Wharton Iron & Steel Company, High Bridge, N. J., reports that its business since the consolidation of the Taylor Iron & Steel Company and William Wharton, Jr., & Co., Inc., consummated at the end of last September, has been very satisfactory. Checks for the preferred dividend at the rate of 7 per cent. per annum, payable out of current earnings, were mailed February 1.

Wage Advances at Steel Works

The advances in wages of employees of United States Steel Corporation subsidiaries, which were announced recently, became effective February 1. In general the advance for unskilled laborers amounts to 2½c. an hour. The pay of skilled laborers is increased from 5 to 10 per cent. Unskilled laborers, who had been getting $1.75 a day for 10 hours' work, will now receive $2 a day, which compares with $1 a day, and in some cases 95 cents a day, in the Pittsburgh district, in the years following the panic of 1893. Thus in sixteen years (as few advances in wages following the panic of 1893 were made earlier than 1897) the wages of common labor in the steel industry have increased about 100 per cent. The February 1 advances also include tonnage men and all employees who are on a piecework basis.

A Birmingham, Ala., dispatch says, referring to the advances announced by the Tennessee Coal, Iron & Railroad Company at its iron mines, quarries, coal mines and manufacturing plants, that the Pratt Consolidated and some other coal mining companies made similar advances.

The widely published dispatches to the effect that independent steel companies had made advances in all departments corresponding to those of the Steel Corporation, are not quite accurate. One of the leading companies in the Pittsburgh district has the question of advances under consideration and will take action a little later. At Youngstown, Ohio, the Republic Iron & Steel Company and the Youngstown Sheet & Tube Company will pay the same rates for day labor as have been announced by the Steel Corporation, these becoming effective February 1. The rate for day labor in the Youngstown district has been 17c. The advance makes it 19½c. an hour, so that for a 10-hour day the wage will be $1.95. The Youngstown rate is one-half cent an hour less than that at Pittsburgh, where the new schedule has established a $2 rate for day labor.

The Lukens Iron & Steel Company and Worth Brothers Company, Coatesville, Pa., have announced that a readjustment of wages of their employees will be made to take effect March 1. There will be a general advance, although detailed percentages have not been definitely decided upon.

Foundrymen's Conventions at Chicago

It has now been decided to hold the annual foundrymen's conventions at Chicago in the week beginning Monday, October 13, 1913, or two weeks later than was decided on by representatives of the various associations in December. The headquarters of the American Foundrymen's Association will be at the La Salle Hotel. The Foundry & Machine Exhibition Company will hold its exhibition of foundry equipment in the Coliseum, which will be available for exhibition purposes as early as Friday, October 10, if it seems desirable to open that early.

A horizontal cross-compound blowing engine of the following dimensions was built for the Société de Senelle-Maubeuge by Leflaive & Co., St. Etienne, France: High pressure cylinder, 51.18 in.; low-pressure cylinder, 78.75 in.; air cylinders, 70.86 in.; stroke, 66.92 in.; speed, 60 r.p.m.; steam pressure, 120 lb. per sq. in.; power about 4000 hp.; weight of engine about 350 long tons; air pressure, 36 lb. per sq. in.; volume of air per minute about 35,000 cu. ft. The total length of the engine is over 75 ft. and the flywheel, 26¼ ft. in diameter, weighs about 92,500 lb. Collmann valves are used on the steam cylinders and Hoerbiger valves on the air cylinders.

Tests of a compressor driven by a steam turbine were made at an installation in the Ruhr district, Prussia. According to a report in Glückauf, the compressor handles 35,000 cu. ft. of air per hour, compressing to 6 atmospheres gauge pressure. The consumption of steam was less than the guarantee, which was: for exhaust steam only, 0.088 lb. per cu. ft. of air compressed at full capacity and 0.112 lb. per cu. ft. at half load; for live steam 0.04 and 0.055 lb. per cu. ft. It will be noted that the turbine is the so-called mixed type.

The Iron and Metal Markets

Production at High Point

Some Steel Works Records in January

Coke and Scrap Lower, with Pig Iron Quiet and Weak

Gauged by pig-iron output, iron and steel production, while at a new high rate, shows that increases are now made with more difficulty. In January the production of coke and anthracite pig iron was 2,795,331 gross tons, or 90,172 tons a day, only 406 tons a day more than in December when the total was 2,782,732 tons. The respective increases of December, November and October were approximately 2000, 1000 and 4600 tons a day.

On February 1, with 298 furnaces in blast, the active capacity was 91,328 tons a day, against 90,721 tons a day for 293 furnaces on January 1. Though the net gain is five furnaces, those blown in in January were of smaller average capacity than those blown out, indicating that furnaces with higher than average costs have at last been attracted into operation—sometimes a sign of a culminating market.

Foundry consumers of pig iron are still holding off. Sellers argue that concessions would be no stimulus, but the suggestion indicates a condition that did not exist six weeks ago. As a matter of fact competition, particularly in Southern iron, and in districts where Northern and Southern Ohio furnaces meet, still brings prices below what have been considered the market. In the Chicago district, however, where sales were made in January at 25 to 50 cents below the $17.50 basis for Northern No. 2 iron, that price is now more generally asked.

The feeling of many pig iron buyers is that, with the supply of iron increasing and weakness showing here and there, they may safely wait and get more light on political uncertainties.

The market for steel making iron has been drifting, though this week some inquiry has come up for Bessemer iron. The basic pig iron average for January as reported from Pittsburgh was $16.45 at Valley furnace; as indicated by quotations in these columns it was $16.41.

Steel companies agree in reporting larger specifications than shipments in January, though new business with some of them has shown a falling off. The Steel Corporation statement of unfilled orders is expected to show little change from that of December 31. In some lines the call for deliveries is getting even more insistent.

Two Eastern steel companies made record outputs in January. The Illinois Steel Company and Gary plants made a new record in ingot production last month at 270,000 tons, against 248,000 tons as the previous high mark.

Apart from the way in which railroad consumption of steel goes on, the prominent feature is the prodigious demand for bars. Leading buyers are in many cases using up twice the quantities they formerly averaged. In spite of this heavy pressure steel bar manufacturers hold to the 1.40c. contract level; meantime bar iron mills are getting from $4 to $6 higher.

Reports of car contracts involve much repetition. The Harriman contract has at last been divided up. The Norfolk & Western bought 2250 and the L. & N. 500. With the Pennsylvania inquiry for 12,300 on which bids are in, the total pending for which early orders are expected is 40,000. The Pennsylvania has placed 100 locomotives in addition to 65 recently, and the N. & W. has bought 40.

Supplemental rail orders keep up. The B. & O. has placed 10,000 tons with the Cambria Steel Company and the Western Maryland 8,400 tons with the Carnegie Steel Company.

An advance of $2 a ton has been made in steel boiler tubes, but no change is announced in iron.

The Philadelphia Company's order for 8300 tons of iron tubing and casing has been divided between two mills. An order for 180 miles of 12-in. pipe has been tentatively placed at Youngstown. Several mills will quote on 100 miles of 12-in. pipe and 75 miles of 16-in. for the Calgary gas line.

Structural steel interests report an excellent outlook. At Pittsburgh a new department store will require 8000 to 10,000 tons and another large building an equal tonnage. In New York the 12,000 tons for the first Queens extension of elevated roads will probably go to the Pennsylvania Steel Company. Bids go in this week on 22,000 tons for another division. On the Panama transmission tower work, 22,000 tons, bids will be taken next week.

The coke market is working lower, and furnace contracts can be made at $3, with further concessions indicated.

The decline in scrap which has been a continuing surprise, in view of the strong market for finished materials, seems not yet to have run its course. Supply is much in excess of demand.

Lake Superior ore roads on the old iron ranges withdrew their dock charge of 5 cents a ton after shippers had carried the matter to the Michigan State Railroad Commission.

A Comparison of Prices

Advances over the previous week in heavy type, declines in Italics

At date, one week, one month and one year previous.

	Feb. 5, 1913.	Jan. 29, 1913.	Jan. 1, 1913.	Feb. 7, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia	$18.50	$18.50	$18.50	$14.85
Foundry No. 2, Valley furnace	17.50	17.50	17.50	13.00
Foundry No. 2 S'th'n, Cin'ti	16.75	16.75	17.25	13.25
Foundry No. 2, Birmingham, Ala.	13.50	13.50	14.00	10.00
Foundry No. 2, furnace, Chicago*	17.50	17.50	18.00	14.00
Basic, delivered, eastern Pa.	18.00	18.00	18.25	14.25
Basic, Valley furnace	16.35	16.35	16.50	12.25
Bessemer, Pittsburgh	18.15	18.15	18.15	14.90
Malleable Bessemer, Chicago*	17.50	17.50	18.00	14.35
Gray forge, Pittsburgh	17.15	17.15	17.15	13.40
Lake Superior charcoal, Chicago	18.00	18.00	18.75	16.00
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	28.50	28.50	27.50	20.00
Open hearth billets, Pittsburgh	29.00	29.00	28.50	20.00
Forging billets, Pittsburgh	36.00	36.00	35.00	28.00
Open hearth billets, Philadelphia	32.00	32.00	32.00	22.40
Wire rods, Pittsburgh	30.00	30.00	30.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	*16.25*	16.75	17.25	15.00
Iron rails, Philadelphia	18.00	18.00	18.00	16.00
Car wheels, Chicago	16.75	16.75	17.25	13.00
Car wheels, Philadelphia	*16.00*	16.25	16.00	12.00
Heavy steel scrap, Pittsburgh	*14.50*	14.75	15.00	12.25
Heavy steel scrap, Chicago	*12.00*	12.50	12.50	10.50
Heavy steel scrap, Philadelphia	*13.50*	14.00	14.50	11.75
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.67½	1.67½	1.67½	1.27½
Iron bars, Pittsburgh	1.70	1.70	1.70	1.25
Iron bars, Chicago	**1.60**	1.57½	1.57½	1.15
Steel bars, Pittsburgh, future	1.40	1.40	1.40	1.15
Steel bars, Pittsburgh, prompt	1.70	1.70	1.70	1.15
Steel bars, New York, future	1.56	1.56	1.56	1.31
Steel bars, New York, prompt	1.86	1.86	1.86	1.31
Tank plates, Pittsburgh, future	1.50	1.50	1.50	1.12½
Tank plates, Pittsburgh, prompt	1.75	1.75	1.75	1.12½
Tank plates, New York, future	1.66	1.66	1.66	1.28½
Tank plates, New York, prompt	1.91	1.91	1.91	1.28½
Beams, Pittsburgh, future	1.50	1.50	1.50	1.12½
Beams, Pittsburgh, prompt	1.75	1.75	1.75	1.12½
Beams, New York, future	1.66	1.66	1.66	1.28½
Beams, New York, prompt	1.91	1.91	1.91	1.28½
Angles, Pittsburgh, future	1.50	1.50	1.50	1.12½
Angles, Pittsburgh, prompt	1.75	1.75	1.75	1.12½
Angles, New York, future	1.66	1.66	1.66	1.28½
Angles, New York, prompt	1.91	1.91	1.91	1.28½
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.20
Steel hoops, Pittsburgh	1.60	1.60	1.50	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Feb. 5, 1913.	Jan. 29, 1913.	Jan. 1, 1913.	Feb. 7, 1912.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.25	1.90
Wire nails, Pittsburgh	1.75	1.75	1.75	1.60
Cut nails, f.o.b. Eastern mills	1.80	1.80	1.75	...
Cut nails, Pittsburgh	1.70	1.70	1.70	1.55
Fence wire, ann'l'd, 0 to 9, Pgh.	1.55	1.55	1.55	1.40
Barb wire, galv., Pittsburgh	2.15	2.15	2.15	1.90
Coke, Connellsville, Per Net Ton, at Oven:				
Furnace coke, prompt shipment	*$3.00*	$3.50	$4.15	$1.80
Furnace coke, future delivery	*3.00*	3.15	3.25	1.80
Foundry coke, prompt shipment	*3.50*	4.25	4.50	2.00
Foundry coke, future delivery	*3.50*	3.60	4.00	2.10
Metals,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	16.50	16.50	17.75	14.25
Electrolytic copper, New York	*16.25*	16.30	17.62½	14.00
Spelter, St. Louis	*6.60*	6.75	7.15	6.40
Spelter, New York	*6.75*	6.90	7.30	6.55
Lead, St. Louis	*4.20*	4.20	4.15	3.90
Lead, New York	4.35	4.35	4.30	4.00
Tin, New York	*48.75*	50.40	50.65	44.00
Antimony, Hallett, New York	*9.00*	9.25	9.50	7.50
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.40

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.50c. to 1.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Wirths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.50c. to 1.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to length, under 3 ft., to 2 ft. inclusive	.25
Cutting to length, under 2 ft. to 1 ft. inclusive	.50
Cutting to length, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.55; galvanized, $1.95. Galvanized barb wire, to jobbers, $2.15; painted, $1.75. Wire nails to jobbers, $1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.70	$1.75	$1.80	$1.85	$1.95	$2.05	$2.15	$2.25
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from January 1, 1913; iron pipe (full weight), from October 21, 1912:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	67	48
½	77	66½	⅜	66	47
¾ to 3	80	71½	½	70	57
			¾ to 2½	73	62

Lap Weld.

2	77	68½	1¼	57	46
2½ to 6	79	70½	1½	68	57
7 to 12	76	65½	2	69	59
13 to 15	53	..	2½ to 4	71	62
			4½ to 6	71	62
			7 to 12	69	56

Plugged and Reamed.

1 to 3, butt	78	69½	1 to 1½, butt	71	60
2, lap	75	66½	2, butt	72	61
2½ to 4, lap	77	68½	1¼, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	57½	⅛	64	53
½	73	66½	½	68	61
¾ to 1½	77	70½	¾ to 1½	72	63
2 to 3	78	71½	2 and 2½	73	64

Lap Weld, extra strong, plain ends.

2	74	65½	1½	66	60
2½ to 4	76	67½	2	67	59
4½ to 6	75	66½	2½ to 4	71	62
7 to 8	68	57½	4½ to 6	70	61
9 to 12	63	52½	7 and 8	64	54
			9 to 12	59	48

Butt Weld, double extra strong, plain ends.

½	63	56½	½	58	50
¾ to 1½	66	59½	¾ to 1½	61	53
2 to 2½	68	61½	2 to 2½	63	55

Lap Weld, double extra strong, plain ends.

2	64	57½	2	56	50
2½ to 4	66	59½	2½ to 4	61	55
4½ to 6	65	58½	4½ to 6	60	54
7 to 8	58	47½	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers in carloads on lap welded steel, in effect from February, 1, 1913, and standard charcoal iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap Welded Steel.		*Standard Charcoal Iron.*	
1¾ and 2 in.	60	1¼ in.	44
2¼ in.	57	1½ and 2 in.	48
2½ and 2¾ in.	63	2¼ in.	44
3 and 3¼ in.	68	2½ and 2¾ in.	53
3½ to 4½ in.	70	3 and 3¼ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 and 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.90

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	2.00
No. 12	2.00
Nos. 13 and 14	2.05
Nos. 15 and 16	2.10
Nos. 17 to 21	2.15
Nos. 22 and 24	2.20
Nos. 25 and 26	2.25
No. 27	2.30
No. 28	2.35
No. 29	2.40
No. 30	2.50

Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

Pittsburgh

PITTSBURGH, PA., February 4, 1913.

Effective February 1 the Carnegie Steel Company advanced wages of common labor at all its plants in the Pittsburgh district from 17½c. to 20c. per hour on a 10-hr. basis, or to the rate of $2 per day. Wages of common labor at its plants in the Youngstown, Sharon, Farrell and New Castle districts are also advanced 2½c. per hour, or from 17c. to 19½c. per hour. The Republic Iron & Steel Company and the Youngstown Sheet & Tube Company will pay the same rates of wages at their mills in Youngstown as are paid by the Carnegie Company. Wages of tonnage men have also been advanced, ranging from 7 to 10 per cent., but the advance does not affect officials and other employees such as superintendents and managers. Several of the leading steel companies report that specifications in January were ahead of shipments, but the new demand has slowed down considerably. This is not causing any uneasiness, as their mills are filled with actual orders to July and have contracts taking a good part of their tonnage to October. Any weakness in prices seems to be confined to so-called raw materials, pig iron, coke and scrap being weak, especially coke and scrap. Coke has declined the past week fully 50c. a ton, and heavy steel and bundled sheet scrap have gone off from 25c. to 50c. a ton. The only advance in prices during the week was $2 at ton on steel boiler tubes, effective February 1.

Pig Iron.—The market continues dull. New inquiry is light. A feature of the situation is that consumers of iron are specifying very promptly, and the Jones & Laughlin Steel Company reports that deliveries are unsatisfactory so far on the large tonnage of Bessemer iron which it bought several weeks ago. W. P. Snyder & Co. give the average price of basic iron on sales of 1000 tons and over for January as $16.45 and of Bessemer $17.25, Valley furnace. Sales of basic iron in January were light. Some inquiry is out for Bessemer iron, and the market is strong at $17.25, Valley. Several small lots of Southern foundry iron have been sold recently in this market on the basis of $13.50, Birmingham, equal to $18.40, Pittsburgh. We quote standard Bessemer iron for first half delivery at $17.25; in the absence of any recent sales we quote basic nominally at $16.35 to $16.50; malleable Bessemer, $17 to $17.25; No. 2 foundry, $17.50; gray forge, $16.25 to $16.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—So little steel is being sold in the open market that it is difficult to quote prices. Consumers are covered by contracts, but deliveries from the mills are still unsatisfactory. When an inquiry for steel comes out the price paid by the buyer depends largely on his necessities, the seller getting the topmost price that he can. It is claimed that small lots of open-hearth sheet bars for prompt delivery have sold as high as $30.50 to $31 at maker's mill. Attempts of a leading consumer recently to buy steel in the outside market were not successful, there being practically no surplus steel to be had. We quote the market nominally as follows: Bessemer billets, $28.50 to $29; Bessemer sheet bars, $29 to $29.50; open-hearth billets, $29 to $29.50, and open-hearth sheet bars, $29.50 to $30, f.o.b. mill, Pittsburgh or Youngstown. Forging billets are $36 to $37 and axle billets $34 to $35, Pittsburgh.

Ferroalloys.—Premiums on ferromanganese for prompt shipment have about disappeared and prices for prompt and extended delivery are practically the same. We quote a sale of 150 tons of foreign 80 per cent. for February and March delivery at $65, seaboard. There is practically no new inquiry for forward delivery as most consumers are covered and are getting better deliveries on their contracts than for some time. The market on ferrosilicon is firm and we note sales of three cars, or about 90 tons, for reasonably prompt shipment at the full price of $75, Pittsburgh. We quote 80 per cent. English ferrosilicon at $65, seaboard, equal to $66.95 delivered, Pittsburgh. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. at $24; 11 per cent., $25; 12 per cent., $26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Wire Rods.—New inquiry is rather light but prices are firm. We quote Bessemer, open-hearth and chain rods at $30, Pittsburgh.

Muck Bar.—There have been no sales in this market for a long time. We quote best grades of muck bar made from all pig iron at nominally $31, Pittsburgh.

Skelp.—The activity in demand in the pipe trade is reflected in skelp, the mills being busy and having their output well sold for two or three months or longer. Sales of about 3000 tons of wide sheared iron plates are reported on the basis of about 1.90c. delivered at buyer's mill in the Pittsburgh district. Prices are firm. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

Structural Material.—The Thompson-Starrett Company has been given the contract for the erection of a 12-story department store on Smithfield street in this city, to be built on the Lewis Block site. It will require 8000 to 10,000 tons of steel; while the contract for the material has not been formally placed it will probably go to the American Bridge Company. The Jones & Laughlin Steel Company has taken about 350 tons for the Carpenter Memorial Library, Manchester, N. H., and is building 10 steel barges for the Vesta Coal Company, an identified interest, about 150 tons of plates and shapes being used in each barge. The Dover Steel Company, which will build a new open-hearth steel works and sheet mill at Canal Dover, Ohio, has placed contracts for its buildings, about 1500 tons. A good deal of local work is coming up, building conditions in this district promising to be very active. A department store is to be built by the Rosenbaum Company in the down town district, which will possibly take about 10,000 tons. The chances for the Pittsburgh Subway being built are much better now than at any time since the project was broached, and if it goes through it will require many thousand tons of plates and shapes. The removal of the Fifth avenue "hump" has resulted in many old buildings being torn down, and these will be replaced by modern structures in which steel will be largely used. At no time has the building outlook in Pittsburgh been better than at present. We quote beams and channels up to 15-in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which means third or fourth quarter of this year, while small lots from warehouse or other sources for delivery in three to four weeks are bringing all the way from 1.75c. to 2c. or higher.

Steel Rails.—The Baltimore & Ohio Railroad has placed an order for 10,000 tons of standard section steel rails with an Eastern mill for forward delivery. The demand for light rails showed a falling off the past week, the Carnegie Steel Company reporting orders and specifications for about 3000 tons. We quote splice bars at 1.50c. per lb., and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—The Harriman interests have been placing in the last few days orders for about 13,000 cars, of which about 5000 went to the Bettendorf Axle Company, Davenport, Iowa, nearly as many to the Pullman Company, and the remainder to be divided among other builders. The Baltimore & Ohio has an inquiry out for 1500 steel cars for early delivery and will probably buy 6000 in all. The Norfolk & Western placed an order for 2250 steel gondolas with the American Car & Foundry Company and is in the market for the plates and shapes for 2000 more, which will be built at its own shops at Norfolk, Va. The Monon has bought 2000 steel cars from the Haskell & Barker Car Company, and the Louisville & Nashville has bought 500 steel hoppers. The Baltimore & Ohio will buy 100 engines, and orders for at least part of them will be placed in a short time. It is announced that the steel car companies are well filled with orders already on their books and in sight to October. Their consumption of plates and shapes for the next seven or eight months will, therefore, be heavy. They are still being hampered to some extent by tardy deliveries of plates by the mills. We quote ¼-in. and heavier tank plates at 1.45c. to 1.50c., Pittsburgh, for delivery at convenience of the mill, which would be not before second

quarter and possibly third quarter, while for delivery in four to six weeks from 1.55c. to 1.60c. is quoted, and for shipment in two weeks, 1.75c. to 1.80c. can be had.

Carwheels.—Of the 12,300 cars to be bought this week by the Pennsylvania Railroad, 8000 will be equipped with steel wheels, requiring 64,000, and the remainder with iron wheels, requiring 34,400. It is probable that the entire order for steel wheels will go to the Carnegie Steel Company. We continue to quote 33-in. rolled steel wheels for freight service at $15 to $15.50 and 36-in. for passenger cars at $19 to $19.50 per wheel, f.o.b. Pittsburgh.

Iron and Steel Bars.—There has been no heavy buying of either iron or steel bars for the past three or four weeks, but specifications against contracts continue strong, two of the leading steel bar mills reporting that their specifications in January were in excess of shipments. This indicates that the steel bar mills are not catching up on back deliveries. Several steel bar makers state they are not making efforts to sell for delivery beyond July 1, believing that possibly in the third and fourth quarters prices may be better. The new demand for iron bars is fairly active, and the mills have more contracts on their books for forward delivery than at any time for some years. In fact, the bar iron trade seems to have taken on a new lease of life, general conditions being better and prices more profitable than for a very long time. Indications are that the bar mills will have all the work they can take care of for the entire year. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for fairly prompt shipments 1.60c. to 1.75c. is readily paid, and in some cases sales for prompt delivery have been made at 1.85c. and higher. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills continue to charge $1 extra per ton for twisting ¼-in. and larger steel bars, and $2 extra for ½ to ⅝ in.

Sheets.—The new demand for steel sheets continues active. The American Sheet & Tin Plate Company states that its specifications in January were the heaviest in any similar month in its history. It has practically no sheets to sell for delivery prior to July, and is accepting orders from its manufacturing customers only for third quarter delivery. Specifications are still running ahead of output. Some mills are inclined to hold their sheets for third quarter delivery, believing that prices will probably be better later on. It is stated that premiums are being paid in some cases for deliveries in four to six weeks from date of contract. The American Sheet & Tin Plate Company is now operating 11 sheet mills, three jobbing mills and one small plate mill at its Gary, Ind., works. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.50c. for No. 28 galvanized and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Several leading makers state that specifications at present are much heavier than usual at this season and it is expected that when the trade gets in full swing, about March 1, there will be a decided scarcity. This will be on account of the heavy contracts on the books and also because of the continued shortage in supply of steel, which is preventing the tin plate mills from making a full output. The past week a large number of inquiries have come out for delivery in second and third quarters, and some contracts have gone to mills that heretofore have not been favored with the business of these buyers. Nothing authentic is heard about an advance in prices, and it is not believed that the market will change in the near future. We continue to quote 100-lb. cokes at $3.60 and 100-lb. ternes at $3.45, f.o.b. Pittsburgh. We quote $2.30 for No. 28 gauge black plate.

Spelter.—Prices have declined sharply. Prime grades of Western are weak at 6.60c., East St. Louis, equal to 6.72½c., Pittsburgh.

Railroad Spikes.—There has been no large buying of railroad spikes for some little time, but railroads continue to specify freely against contracts, and the makers have their output pretty well sold up to July. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.90, and small railroad and boat spikes at $1.90 and $2 per 100 lb., f.o.b. Pittsburgh, for forward delivery.

Hoops and Bands.—The new demand is quiet, but mills state that buyers are specifying freely against contracts. We quote steel bands at 1.45c. to 1.50c., with extras as per the steel bar card, and steel hoops at 1.60c. to 1.65c., f.o.b. Pittsburgh, these prices being on orders for shipment at the convenience of the mills.

Shafting.—As most consumers have covered ahead to July, and in some cases through the entire year, the new demand is not heavy. Specifications against contracts are coming in freely. We quote cold-rolled shafting at 58 per cent. off in carloads and larger lots and 52 per cent. in small lots, delivered in base territory.

Merchant Steel.—Specifications are good and shipments by two leading mills in January are reported to have been heavier than in December. Leading makers have their output pretty well under contract to July 1. The new demand is only fairly active. Prices are firm. We quote: Iron finished tire, 1½ x ⅜ in. and larger, 1.40c. to 1.55c., base; under 1½ x ⅜ in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, ¾, ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Wire Products.—Wire nails are active, but wire is quiet. The labor troubles at the Braddock and Rankin works of the American Steel & Wire Company are pretty well over, reports to-day stating that at the Braddock works 80 to 85 per cent. of the men had returned. At the Rankin works, day turn, about 80 per cent. of the men are back and on the night turn 65 to 70 per cent. The men at these two plants were given an advance in wages February 1, as announced a month or more ago by Chairman Gary of the Steel Corporation. This advance had nothing to do with the strike, but was given the men according to programme and is the same as has gone into effect at the other works of the corporation. It is believed that the entire trouble will be over before this week is out. We quote wire nails at $1.75 per keg; cut nails, $1.70 per keg; galvanized barb wire, $2.15 per 100 lb.; painted, $1.75; annealed fence wire, $1.55, and galvanized fence wire, $1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Bolts and Rivets.—Makers state that new demand has fallen off to some extent, as consumers are covered to July 1 or longer, but specifications against contracts are still coming in freely. Prices are firm but unchanged. We quote button head structural rivets at $2.20 and cone head boiler rivets at $2.30 per 100 lb. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70% off
Small machine bolts, rolled threads	75, 10 and 5% off
Small machine bolts, cut threads	75 and 10% off
Large machine bolts	70 and 7% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts ⅝ and larger	$6.60 off list
Hexagon nuts smaller than ⅝	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts ⅝ and larger	85% off
Semi-finished hex. nuts smaller than ⅝	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off

Merchant Pipe.—The recent inquiry of the Philadelphia Company for 8300 tons of iron tubing and oil well casing has been divided between A. M. Byers & Co. and the Youngstown Sheet & Tube Company. Several mills will quote on the inquiry from the Calgary district in Canada for 100 miles of 12-in. and 75 miles of 16-in. pipe for a gas line. The Hope Engineering Company of this city is handling the inquiry, and it is expected to develop into actual business in a short time. The order of the Columbia Gas & Electric Company for 180 miles of 12-in. has been tentatively placed with a Youngstown mill. The new demand for merchant pipe in January showed a slight falling off as compared with December, but is still much heavier than usual for the season. Local mills have recently taken about 400,000 ft. of small iron and steel pipe for shipment to Canada. It is stated that discounts on both iron and steel pipe are being firmly held.

Boiler Tubes.—Effective February 1, the National Tube Company announced an advance of one point, or $2 a ton, in steel tubes, and the advance has been followed by the other makers. There has been no change in prices on iron tubes. The new demand for locomotive and merchant tubes is heavy, and the mills are filled up for several months. The discounts now in effect are given on a previous page.

Iron and Steel Scrap.—The embargo on scrap routed for the Pittsburgh Steel Company, Monessen, Pa., has been lifted, but the company has not shown any signs of entering the market. Other leading local consumers are also doing nothing in this line. Considerable heavy steel scrap and bundled sheet scrap are pressing the market to find buyers. Some small sales of heavy steel scrap have been made at $14.50 delivered at buyer's mill. We note sales of 1500 tons of compressed detinned scrap at $13.50 and 1000 tons of bundled sheet scrap at $12, delivered to consumer's mills. We have reduced quotations on heavy steel and bundled sheet scrap. Dealers quote, per gross ton, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$14.25 to $14.50
No. 1 foundry cast	15.00 to 15.25
No. 2 foundry cast	14.00 to 14.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.00 to 12.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	14.25 to 14.50
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.00 to 18.25
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	27.75 to 28.00
No. 1 busheling scrap	14.25 to 14.50
No. 2 busheling scrap	10.25 to 10.50
Old carwheels	15.75 to 16.00
*Cast-iron borings	10.00 to 10.25
*Machine shop turnings	9.50 to 9.75
†Steel bar crop ends	16.50 to 16.75
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	16.00 to 16.25
Heavy steel axle turnings	12.75 to 13.00
Stove plate	10.75 to 11.00

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—There is practically no new demand for coke, either for prompt shipment or forward delivery, and prices have further declined. We now quote standard grades of furnace coke for prompt shipment at $3 per net ton at oven, and for forward delivery at the same price, but it is possible that some of the smaller operators who have been holding their coke for some time for high prices, and now realize they held it too long, might sell for $2.75. We note sales of 50 cars of standard grade furnace coke for prompt shipment at $3.15; 40 cars at $3.10, and 25 cars at $3 per net ton at oven. The new demand for foundry coke is also quiet, and we quote best grades of 72 hour for prompt shipment at $3.50 to $3.75 and on contracts for forward delivery at $3.50 per net ton at oven. The output of coke in the Connellsville region last week, as given by the Connellsville Courier, was 416,282 net tons, a decrease over the previous week of about 13,600 tons.

Chicago

CHICAGO, ILL., February 4, 1913.

Steel specifications placed in this territory in January totaled more than in December. The specifications booked by a large interest the past week were approximately double the tonnage its mills could produce, notwithstanding weather conditions have been exceedingly favorable to mill operation. It is understood that fully one-half of the tonnage now on the books of some of the leading producers has already been specified. Specifications received are surprisingly well distributed. In contrast to the exceptionally strong new material situation, the market for scrap continues to decline and prices are weaker than when last quoted. There are as yet no signs of the consumption of old material overtaking the available supply. In the absence of buying, pig iron is also lacking in firmness and desirable business can be placed in the South on the basis of $13.50 and in the North at $17.50, f.o.b. furnace.

Pig Iron.—The failure of the expected buying movement in pig iron to materialize for delivery in the second and third quarters continues to exert a depressing influence on the market. There is a general disposition among melters to defer additional purchases, notwithstanding they are vigorously pressing furnaces for deliveries on existing contracts. Where the delivery desired and the analysis are attractive, local iron can still be had at as low a price as $17.50 at the furnace, but for prompt shipment in the first quarter the makers are practically out of the market on regular grades. The spot shipment market for Northern iron is therefore as firm as at any time and outside furnaces are able to deliver here at full prices. Spot Southern iron, on the contrary, is readily available at $13.50, Birmingham, and it is probable that for forward delivery considerable iron is also available at that price. Some Southern furnaces that were quoting $13.50 have now returned to the basis of $14, following heavy sales of iron. In both the North and the South a resumption of buying would undoubtedly be followed by an immediately returning firmness. The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal; Nos. 1, 2, 3, 4	$18.00 to $18.75
Northern coke foundry, No. 1	18.00 to 18.50
Northern coke foundry, No. 2	17.50 to 18.00
Northern coke foundry, No. 3	17.00 to 17.50
Southern coke, No. 1 foundry and No. 1 soft	18.35 to 18.85
Southern coke, No. 2 foundry and No. 2 soft	17.85 to 18.35
Southern coke, No. 3	17.35 to 17.85
Southern coke, No. 4	16.85 to 17.35
Southern gray forge	16.85 to 17.35
Southern mottled	16.35
Malleable Bessemer	17.50 to 18.00
Standard Bessemer	19.40 to 19.90
Basic	17.50 to 18.00
Jackson Co. and Kentucky silvery, 6 per cent	20.40
Jackson Co. and Kentucky silvery, 8 per cent	21.40
Jackson Co. and Kentucky silvery, 10 per cent	22.40

Rails and Track Supplies.—Railroad specifications, though still heavy, have fallen somewhat behind the exceptional record of January. In the endeavor to assure themselves of supply for spring construction work, rails and track fastenings have been ordered in advance at a rate impossible to maintain. Sales of 1000 tons of girder rails at Milwaukee and 750 tons at Des Moines are noted, while inquiries totaling 6000 tons are pending. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The local building situation is temporarily quiet and, with the exception of projects previously mentioned and still pending, new steel structures are lacking. Contracts for fabricated steel placed during the week include 970 tons for the Claypool Hotel addition at Indianapolis, the award being made to Noelke-Richards Iron Works; 542 tons for the Wisconsin Steel Company's new merchant mill, awarded to the McClintic-Marshall Construction Company; 566 tons for new piers at San Francisco, to the American Bridge Company; 249 tons for the Wisconsin River Power Company, to the Wisconsin Bridge & Iron Company, and 228 tons for a Chicago, Milwaukee & St. Paul office building, to A. Bolter's Sons. The American Beet Sugar Company, Oxnard, Cal., has let a contract for 200 tons of steel for a new building, and the Southwest Missouri Railroad a contract for 148 tons for a new bridge near Webb City, Mo. We quote for Chicago delivery, plain shapes, 1.63c.

With delivery from mill becoming more protracted than otherwise, store business continues to show an unprecedented volume. The new jobbers' stock lists now show the recently announced extras for cutting to short lengths.

Plates.—Formal contracts were closed the past week with the car builders for a large portion of the Harriman orders. The railroads are still buying locomotives, and there is little doubt that the specific orders noted are but a portion of the actual equipment purchased. Plate specifications to mill were very heavy in January. We quote for Chicago delivery, from mill, 1.63c.

Despite the wide variety and large aggregate of orders, some of the local jobbers are making better deliveries on material cut to size than at any time previously, the ordinary material being delivered in from three to four weeks. We quote for plates out of store 2.05c.

Sheets.—Gradually the local mills are being forced to let down the bars and place on their books new business for second half delivery. The continued pressure of consumers' requirements is as unceasing as it is surprising. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.88c.

Out of store, we quote as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Bars.—While no large transactions in bar iron are reported, a number of orders of less than 100 tons to 500 tons are noted. For small lots, where mill rollings made exceptionally prompt delivery possible, premiums of $1 a ton have been paid and for ordinary delivery the market is firm on the basis of 1.60c. There is some buying of steel bars for filling-in purposes, and tentative inquiries covering contract tonnage are also noted from some of the agricultural implement makers. A disposition to offer contracts for implement bars covering a period of only six months instead of a year is being manifested by some of the steel bar makers, but others of the large producers seem definitely opposed to any change. We quote for mill shipment as follows: Bar iron, 1.60c. to 1.65c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

Local jobbers are experiencing an exceptionally heavy demand for bars, and in some sizes of small angles the supply is depleted almost to exhaustion. For delivery from store, we qutoe soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

Rivets and Bolts.—Bolt prices are unusually firm, and new business appears at a more rapid rate than deliveries can be made on existing orders. The situation as regards rivets is easy and prices, particularly for resale stock, are subject to some concessions. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ⅜ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; large sizes, 70-7½; coach screws, 80-10; hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅜ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅜ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

Old Material.—The buying of scrap in this market the past week has been exceedingly limited, and each transaction has brought out prices somewhat lower than our last quotation. Even the foundry grades, which have been the strongest items, have yielded under pressure with the exception of stove plate, sales of which are noted at $10.75 and $11. The only improvement in the situation is a reduction of the congestion at some of the consumers' yards. Railroad offerings of scrap include 2600 tons from the Chicago & Northwestern, of which 700 tons is old steel rails. The Baltimore & Ohio has issued a general list carrying 12,000 tons, and in addition 400 tons located at East Chicago. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$16.25 to $16.75
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Shoveling steel	11.75 to 12.25
Steel axle turnings	10.50 to 11.00

Per Net Ton.

Iron angles and splice bars	$15.50 to $16.00
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	12.00 to 12.50
Iron car axles	21.00 to 21.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
Cut forge	12.00 to 12.50
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.75 to 13.25
Locomotive tires, smooth	13.75 to 14.25
Machine shop turnings	7.50 to 8.00
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.75 to 11.25
No. 2 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	12.75 to 13.25
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Pipes and flues	9.25 to 9.50

Cast Iron Pipe.—The 1000 tons of pipe for Yankton, S. D., will be furnished by the United States Cast Iron Pipe & Foundry Co., which company is also the low bidder on 1500 tons for Indianapolis. Of the local requirements of pipe, both water and gas, the city has yet to purchase in the neighborhood of 5000 tons, but the local gas company is understood to have provided for its entire needs with its purchase of about 1100 tons in December. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $31; 6 to 12 in., $29; 16 in. and up, $28, with $1 extra for gas pipe.

Wire Products.—With the exception of the movement to replenish warehouse stocks, current demand for wire products is largely from the South. The manufacturing trade now has the larger portion of its shipment from mill in hand. Prices are distinctly firm. We quote as follows: Plain wire, No. 9 and coarser, base, $1.73; wire nails, $1.93; painted barb wire, $1.93; galvanized, $2.33; polished staples, $1.93; galvanized, $2.33, all Chicago.

Philadelphia

PHILADELPHIA, PA., February 4, 1913.

The pig iron markets could scarcely be quieter; in few grades has enough business been moving to establish a market. Both buyers and sellers are pursuing a waiting policy. Eastern finished material mills made high record productions in January. There is little diminution in specifications, but in some classes of material new orders are smaller. Considerable inquiry for materials for car construction continues to come out and inquiries for material for two boats, requiring 4000 tons of plates each, for delivery late in the year, are before the trade. Iron bars are in lighter demand, while billets and sheets are more active. Further price weakness is shown in both foundry and furnace coke. The old material market is quiet and prices show a further recession.

Iron Ore.—Very little inquiry is pending and sales have been unimportant. Importations during the week include 4750 tons from Cuba, 1000 tons from Venezuela, 6950 tons from Newfoundland, 7180 tons from Sweden and 482 tons from Spain.

Pig Iron.—Sales aggregate but a small total. In some grades the market has been at an absolute standstill. Producers are making no effort to force sales, to do which would undoubtedly bring prices to a lower level. Producers and consumers are pursuing a waiting policy; the former are fairly well sold ahead, the latter pretty well covered for the first quarter. A strong feature of the present market, from the producer's viewpoint, is that consumers are steadily taking iron contracted for, and in numerous instances are urging producers for delivery. Consumption is on a high level and promises so to continue. There is no accumulation of iron on furnace yards. In very few cases have individual sales during the past week exceeded 100 tons; as a rule, carload lots predominate, on which producers obtain full prices, $18.50, delivered, for standard brands of eastern Pennsylvania No. 2 X, and $18.25, delivered, for less desirable brands. Business under existing circumstances is largely of a noncompetitive nature, and it is difficult to say what producers would do in the way of quotations if a good inquiry came out. The movement in Virginia foundry continues small. Producers maintain quotations at $16, furnace, for No. 2 X foundry, but the quantity available is small, although lower grades are obtainable. For second quarter shipment $15.50, furnace, for No. 2 X can be done. Very little inquiry for off-grade iron is coming from the cast-iron pipe makers. Several, however, are taking on odd lots offered from time to time, usually at slight price concessions. Considerable inquiry for rolling mill forge is pending, but buyers are in no haste to close. More active business in this grade is expected in the near future. The demand for steel making iron has been practically at a standstill. Consumers of basic have not yet entered the market for second quarter and prices are somewhat problematical. Low phosphorus pig is decidedly strong and scarce, producers being well sold up for a considerable period. Under existing market conditions quotations must be considered as largely nominal and are so quoted. The following range about represents the market for standard brands in small lots for prompt or early shipment, delivered in buyers' yards in this vicinity:

Eastern Pennsylvania No. 2 X foundry	$18.50
Eastern Pennsylvania No. 2 plain	18.25
Virginia No. 2 X foundry (first quarter)	$18.80 to 19.00
Virginia No. 2 plain (first quarter)	18.55 to 18.75
Virginia No. 2 X foundry (second quarter)	18.30 to 18.50
Virginia No. 2 plain (second quarter)	18.05 to 18.25
Gray forge	17.50 to 17.75
Basic	18.00 to 18.25
Standard low phosphorus	24.50

Ferroalloys.—There has been almost an entire absence of inquiry either in small or large lots, for prompt or forward shipment. Eighty per cent. ferromanganese

is quoted at $65, seaboard, for either prompt or forward shipment. Occasional carload inquiry for Bessemer furnace ferrosilicon is reported, but there is no demand for 50 per cent. grade. Ferrosilicon prices are unchanged. Importations of ferromanganese at this port last week aggregated 997 tons.

Billets.—Further heavy sales of rolling and forging billets for second quarter delivery have been entered by mills in this district and consumers are making inquiries for third quarter requirements, although makers have not opened books for such delivery. A good volume of business for first quarter shipment is offered, but mills are able to accept but little, in some cases being oversold. Several 3000 to 5000 ton lots of rolling steel for second quarter delivery have been entered at close to full prices. Foreign business continues to be offered, but mills show little interest, being fully taken up with the domestic demand. The leading Eastern mill made a new high record for production during the month of January. Prices are firm, ordinary business for extended shipment being taken at $32, delivered, for basic open-hearth rolling billets, and $36, mill, minimum for ordinary open-hearth forging steel.

Plates.—New business continues to be offered at a high rate, particularly from car and bridge builders. Delaware River shipbuilders are inquiring, for estimate purposes, for plates for two vessels requiring an aggregate of 8000 to 10,000 tons, delivery on which would begin late in the year. Eastern mills continue to receive heavy specifications, and are operating at full capacity, but are unable to do better on deliveries. The Lukens Iron & Steel Company made new high record productions for output and actual deliveries during the month of January. Little new export business is reported. Heavy inquiries are still being received from Western consumers, largely for near future delivery. Prices are firmly maintained and while some Western producers are quoting 1.65c., delivered, for uncertain extended shipment, Eastern mills obtain 1.75c. for sheared, and 1.80c., for universal plates, delivery over the first half of the year.

Structural Material.—A large amount of fabricated structural material in nearby districts is being quoted on. In this immediate vicinity business continues of an unimportant character. Estimates are being made for some 400 tons for a new building for the Girard College, and several other projects are pending, including some small bridge work. Current business in plain shapes continues on a good basis. January business with the mills was fully up to normal and February starts off equally as good. Further inquiries for boat shapes for delivery late in the year have come out. Prompt delivery on plain shapes still commands premiums. Prices are firm, 1.75c. being named by Eastern mills for plain shapes for early shipment.

Sheets.—The demand is heavier and mills have entered a good volume of business. More tonnage for extended delivery has been entered by Eastern mills than ever before and further orders for future shipment could be taken if makers were willing. Eastern mills are operating at full capacity and are well suppied with specifications. While 1.90c., delivered, is named for Western No. 10 blue annealed sheets, early shipments are hard to get and Eastern mills making smooth, loose-rolled sheets readily obtain 2.05c. for early shipments.

Bars.—Mills are receiving good specifications against orders and continue fully engaged, but consumers show less haste to get orders placed. In some grades the supply is larger, particularly ordinary iron bars. For reasonable delivery iron bars are quoted at 1.67½c., delivered here, although up to 1.77½c. is paid, dependent on grade. Good orders for steel bars for early shipment have been placed at 1.85c., delivered. Contract steel bars for extended delivery are still available at 1.55c. to 1.60c., here.

Coke.—The market continues soft and the volume of business placed has been small. Moderate orders for foundry coke for first half or prompt shipment have been placed at prices ranging from $3.75 to $4.50, oven, although the higher range is confined to strictly high grade coke. Furnace coke has been quiet. Spot coke is in light demand, with quotations around $3, oven. The following range of prices, per net ton, delivered in this district, is named:

Connellsville furnace coke	$4.75 to $5.25
Connellsville foundry coke	5.75 to 6.25
Mountain furnace coke	4.50 to 5.00
Mountain foundry coke	5.40 to 5.90

Old Material.—The market is listless and transactions are mostly in the nature of forced sales made at price concessions. Eastern mills are well supplied with scrap and show little interest in the market. Open weather has permitted a steady accumulation of old material and the supply in practically all grades is in excess of the demand. Mills will not pay over $13.50 for heavy melting steel, and are not particularly interested at that figure. The February railroad scrap lists show about the average offerings of old material. Moderate lots of low phosphorus scrap have been sold at $18.30, delivered. Prices are largely nominal, the following range about representing sellers' ideas for deliveries in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel	$13.50 to $14.00
Old steel rails, rerolling (nominal)	16.00 to 16.50
Low phosphorus heavy melting steel scrap	18.00 to 18.50
Old steel axles (nominal)	19.00 to 20.00
Old iron axles (nominal)	27.00 to 28.00
Old iron rails	18.00 to 18.50
Old car wheels	16.00 to 16.50
No. 1 railroad wrought (nominal)	15.50 to 16.00
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.25 to 12.75
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	10.00 to 10.50
Wrought turnings	10.50 to 11.00
Cast borings	10.50 to 11.00
Machinery cast	14.50 to 15.00
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	13.50 to 14.00

Cleveland

CLEVELAND, OHIO, February 4, 1913.

Iron Ore.—Ore firms have received advices from Marquette that the railroads serving the Old Range iron ore mines have announced that the proposed dock charges have been withdrawn. This is an important victory for the shippers and mining companies. A few weeks ago the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul railroads issued new freight tariffs for ore shipped to Escanaba and Marquette in which a proposed charge of 5c. a ton was incorporated for storage in cars at docks, unloading from cars to docks and loading ore vessels. After the expiration of ten days an additional charge of 5c. a ton was to be made for every 10 days or fraction thereof for ore left in the cars and on the docks. A few days ago the Chicago & Northwestern Railroad issued a revised tariff reducing the latter proposed charge to ¼c. a ton for each day. Ore firms protested vigorously against these proposed charges. These protests to the railroads appeared to be without effect and the matter was taken before the Michigan State Railroad Commission, before which a hearing was held on the matter a few days ago. Before this commission handed down a decision on the matter the railroads withdrew the proposed charges. Shippers expected that had the Michigan roads been able to enforce the collection of these dock charges similar charges would have been put into effect by the Minnesota railroads. No ore sales or inquiries are reported. We quote prices as follows: Old Range Bessemer, $4.40; Mesaba Bessemer, $4.15; Old Range non-Bessemer, $3.60, and Mesaba non-Bessemer, $3.40.

Pig Iron.—While the market in this territory as well as throughout most of the Central West is generally quiet, there is a fair demand for small lots of foundry iron for early delivery from foundries that had not bought as much iron as they need. A buying movement for the last half has not materialized. Consumers generally are taking no interest in contracts for that delivery, feeling that prices will go no higher and may possibly be slightly lower. The weakness in the market on Northern foundry grades noted last week continues. It appears that considerable iron is being offered by Valley furnaces at $17 for No. 2 foundry for early delivery, but sellers claim that they will not make this quotation for the last half. In spite of the weakness on the part of some sellers others are firmly adhering to the $17.50 price. Local furnaces are holding to this price for delivery in this territory, but some concessions have been made to absorb a portion of the freight rates on sales for shipment outside of the immediate territory. No change is reported in the Southern price situation. Some of the Alabama as well as Tennessee furnaces are offering No. 2 Southern for delivery through the remainder of the year at $13.50, Birmingham. For prompt shipment and for the first half we quote, delivered Cleveland, as follows:

Bessemer	$18.15 to $18.40
Basic	17.25 to 17.50
Northern No. 2 foundry	17.75
Southern No. 2 foundry	17.85 to 18.35
Gray forge	17.15 to 17.40
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

Coke.—Prices show a further decline and the lower quotations have stimulated activity in foundry grades. Some consumers who have been holding off because of high prices are now placing contracts and others are buying more freely for early shipment. Standard 72-hr. foundry coke is quoted at $3.75 to $4.25 per net ton at oven for spot shipment and $3.75 to $4 for first half. For the entire year $3.50 is quoted. We note the sale of 100 cars of Wise County, Virginia, foundry coke for delivery from July to July at $3.75. Furnace coke is quoted at $3.25 for spot shipment and $3 for contract.

Finished Iron and Steel.—For the greater part of January the situation regarding deliveries seemed somewhat easier but, in the past week consumers have again been crowding the mills harder for shipments. Considerable new inquiry is coming out, but much of this is from consumers who are unable to secure shipments on specifications. Jobbers report an increase in the volume of stock orders. Local warehouse business broke all January records and exceeded that of December. Some new contracts are being placed for delivery at the convenience of the mills. A fair volume of business is coming out in small lot orders at premium prices for material for early delivery. Plate orders for delivery at 60 days are being placed at 1.60c., Pittsburgh. Some structural orders with specifications for third quarter delivery are being taken at 1.50c. For earlier delivery structural is quoted at from 1.65c. to 1.85c. Eastern mill, the later prices being quoted for prompt shipment. James L. Stuart has taken the contract for the municipal electric light building in Cleveland. The sub-contract for structural work, involving 1000 tons, was placed with the Noelke-Richards Company, Indianapolis, Ind. Sheets are in good demand and some of the mills decline to sell at regular quotations for future delivery. The Carnegie Steel Company will furnish 900 tons of steel for the new ore handling plant to be built by the Wellman-Seaver-Morgan Company for the Wheeling & Lake Erie Railroad Company at Huron, Ohio. Bar iron is firm at 1.65c., Cleveland. Warehouse prices are unchanged at 2.10c. for steel bars and 2.25c. for plates and structural material.

Old Material.—The market is inactive and prices are very weak. Quotations on several grades, including cast scrap, borings and turnings and iron rails, have declined 50c. a ton. Heavy steel scrap is 25c. a ton lower. There is very little demand. Dealers are making concessions to move small lots. A large tonnage is being offered by the railroads this month, lists being out from the Lake Shore, Pennsylvania Lines West, Erie and Wheeling & Lake Erie. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$15.00 to $15.50
Old iron rails	17.00 to 17.50
Steel car axles	18.75 to 19.25
Heavy melting steel	13.00 to 13.25
Old car wheels	15.00 to 15.50
Relaying rails, 50 lb. and over	23.00 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	12.50 to 13.00

Per Net Ton.

Iron car axles	$22.00 to $22.50
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings	7.00 to 7.50
Steel axle turnings	9.25 to 9.50
No. 1 busheling	11.75 to 12.25
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.75 to 13.00
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, February 5, 1913.—*(By Telegraph.)*

Pig Iron.—While salesmen assert that many buyers are holding back on account of the uncertainty as to the policy of the incoming national Administration, there is considerably more quiet buying of small lots for filling in than for two weeks. A number of melters are not covered for the second quarter, and will be compelled to come into the market soon. Prices are unchanged, and $13.50, Birmingham, and $16.50, Ironton, are quotations for nearby shipment, although several Alabama producers are holding out for $14. While there are rumors that a few interests would not turn down firm offers for last half business at the first named figures, these cannot be substantiated, and as the situation now stands a change in quotations seems imminent, with indications pointing toward a firmer market. A central Ohio firm is asking for 1000 tons of special analysis iron for first half shipment. An Indiana manufacturer wants 2000 tons of both Northern and Southern foundry iron for the last half. Malleable is dull, and there are no large inquiries out for basic. The consumption of all grades of iron is at the top notch in the Central West, and while there is a reported slight increase in stocks in the South, the reverse is stated to be the case in the Hanging Rock district. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$17.00 to $17.50
Southern coke, No. 2 foundry and 2 soft	16.75 to 17.25
Southern coke, No. 3 foundry	16.50 to 17.00
Southern, No. 4 foundry	16.25 to 16.75
Southern gray forge	16.00 to 16.50
Old silvery, 8 per cent. silicon	20.70 to 21.20
Southern Ohio coke, No. 1	18.20 to 18.70
Southern Ohio coke, No. 2	17.70 to 18.20
Southern Ohio coke, No. 3	17.45 to 17.70
Southern Ohio malleable Bessemer	17.70 to 18.20
Basic, Northern	18.20 to 18.70
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	27.25 to 27.75

(By Mail)

Coke.—While there is some inquiry for spot shipment furnace and foundry coke, the amount under negotiation is very small. A central Ohio consumer is understood to have put out a general inquiry for 2000 tons of 48-hr. coke, for prompt shipment, and several producers were unable to make bids for the business. The spot market has weakened in all three districts to some extent, and quotations are $3.65 to $3.90 at oven on 48-hr. brands, with $3 to $3.25 named on contracts. Foundry coke is quoted, for prompt shipment, around $4 to $4.25, with about 50c. less on contract business. All of the above prices apply to Connellsville, Pocahontas and Wise County, with the probability that oven operators in the last two districts would shade quotations about 25c. a ton.

Finished Material.—There does not seem to be any let-up in the demand for all classes of finished material. On the contrary, there has been a better demand in the past few days for structural material and sheets. Not much new business can be taken on by mill agencies for prompt delivery, and local merchants are now able to obtain fair prices for orders that they are able to fill. Warehouse prices on steel bars range from 2.05c. to 2.15c. and on structural shapes from 2.15c. to 2.25c.

Old Material.—Scrap-iron merchants are closely watching the pig-iron situation, and are slow in taking on any large quantities of old material. Prices are weak, but there is not enough business transacted to justify a change in previous quotations. The minimum prices given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum figures are dealers' prices f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$10.50 to $11.00
Old iron rails	14.00 to 14.50
Relaying rails, 50 lb. and up	21.00 to 21.50
Rerolling steel rails	13.00 to 13.50
Melting steel rails	11.00 to 11.50
Old carwheels	12.75 to 13.50

Per Net Ton.

No. 1 railroad wrought	$11.00 to $11.50
Cast borings	7.00 to 7.50
Steel turnings	7.50 to 8.00
No. 1 cast scrap	10.75 to 11.25
Burnt scrap	7.75 to 8.25
Old iron axles	18.25 to 18.75
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	7.50 to 8.00
Malleable and steel scrap	9.25 to 9.75
Railroad tank and sheet scrap	6.25 to 6.75

Birmingham

BIRMINGHAM, ALA., February 3, 1913.

Pig Iron.—Only one furnace interest in Alabama, as far as can be learned, is selling pig iron under $14. The company in question operates one furnace, was late in entering the market and has 8000 to 10,000 tons of accumulated iron. One furnace company turned down a $13.50 sale made by an agent and sold 1000 tons of iron during the week for $14. This company names $14 for first half. Another company is out of the market as far as its Birmingham district furnaces are concerned and is quoting its north Alabama make at $14 for early delivery and $14.50 for second quarter. It has recently booked orders for quick delivery to Trieste and Fiume on a $14.50 Birmingham basis, and other foreign inquiries are pending. Still another, which from October to January 1 sold nothing under $14.50, has not sold under $14 this year. Recent small sales made by it brought $15 for special analysis and

$13.50 for No. 4. There have been small sales of resale iron by local merchants for local consumption at $13.50. Concessions made by warrant iron holders do not seem to have produced business. The furnace interest offering $13.50 iron sold 400 tons during the week at that figure, but its stocks are not materially diminishing. Buyers continue to offer lower prices for furnace iron, but fail in efforts except as noted. A quotation of $12.75 on a lot of No. 4 iron made to a large stove concern was delivered and $12 offered in turn, which the furnace broker turned down. Owing to wage advances to workmen in coal mines, quarries, etc., the cost of iron making will increase, and that increase must be taken care of. With due consideration for the different classes of sellers, quotations on Alabama pig iron remain as follows:

No. 1 soft and foundry	$14.00 to $14.50
No. 2 soft and foundry	13.50 to 14.00
No. 3 foundry	13.25 to 13.75
No. 4 foundry	13.00 to 13.50
Gray forge	12.75 to 13.25
Basic	13.50 to 14.00
Charcoal	25.00 to 25.50

Cast Iron Pipe.—Manufacturers of water pipe report no new orders of size and acknowledge a tendency to price sagging. Makers of smaller sizes continue to operate on full time and are accumulating stock. Many of the larger pits are not operating. Somewhat better conditions are reported as prevailing in the soil pipe shops. Quotations, which might be shaded for big business, are $24.50 for 4 in. and $22.50 for 6 in. and over, with $1 added for gas pipe.

Coal and Coke.—Coke is in strong demand and good foundry is still bringing $4 at oven. The output is close to the maximum. The Tennessee Company and other operators have advanced coal miners' wages from 55 to 57¾c. per ton, Pratt Mines basis, which is one-quarter of a cent more than the prior highest wage paid in 1907. Practically all Alabama scale wage mines will pay the advance. With corresponding advances in wages of helpers and others, the cost of mining coal will increase 5c. to 6c. per ton. The mines are busy with demand for the full output, and movements from mines are easier than in some time.

Old Material.—While yards do not show large accumulations, the volume of business is not quite up to the standard prevailing for several weeks. Relaying rails and melting scrap are in good demand and the movement from yards is fairly good. Quotations, which are not changed, but would probably be shaded for good business, are as follows, f.o.b. dealers' yards per gross ton:

Old iron axles	$15.50 to $16.00
Old steel axles	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 heavy melting steel	11.50 to 12.00
Tram car wheels	12.00 to 12.50
Standard car wheels	12.50 to 13.00
Light cast and stove plate	9.50 to 10.00

St. Louis

ST. LOUIS, MO., February 3, 1913.

The trend of business in this territory is in an encouraging direction, and the disposition is to expect better things in the near future. The softening recently noted in some directions seems to have been checked.

Pig Iron.—The recent recession of 50c. in pig iron is regarded by representatives as having shaken out most if not all of the resale iron which is thought to have been the cause of the softness of the market, and a number report furnaces as directing them to hold to the $14 quotation for Southern pig, Birmingham basis, from now on. It is likely that this tendency will increase, as it is becoming known that consumers are using their supplies pretty rapidly and will need to make arrangements for replenishment of their yards. The inquiries at present are chiefly for carloads for filling-in purposes or for special use. The demand for forward shipment on contracts is as insistent as ever. The inquiry for 2000 tons of malleable recently reported is understood to have developed into a sale out of this territory for shipment into St. Louis.

Coke.—There has been a softening of coke prices, and as a result consumers are expected to show more interest in the market, especially if deliveries can be improved. By-product is quotable on the Connellsville basis.

Finished Iron and Steel.—Business continues very good, according to representatives of the mills, and the aggregate is expected to show a further addition to the unfilled tonnage for the past month. An interurban road has contracted for 22 miles of standard section steel rails, and a number of other similar contracts are pending or approaching the definite stage. Orders for structural shapes continue to flow in, but no large new contracts were placed. In the agricultural and wagon trade the demand keeps up and new business is placed continuously. Track fastenings are in good request for the season. Bars are also in excellent demand. The fabricating shops are consistent purchasers, seeking to get their stocks in good shape for spring. General reports from the St. Louis territory show that no cancellation of contracts is being sought, while in a large number of instances efforts are being made to increase original tonnage. Shipments are reported in worse shape, much difficulty being encountered in getting supplies forward fast enough to suit consumers.

Old Material.—The past week has shown no further softening of prices, and dealers are looking for betterment. This is due to information that a number of mills will be in the market soon for a considerable tonnage, having about cleared up their yards to a point where buying should begin again. They are also known to be provided with orders reaching fully six months ahead, and their needs will bring them into the market. The Missouri Pacific closed a list of about 1500 tons to-day, and the Frisco one of 800 tons. These were the only railroad lists out. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, re-rolling	15.50 to 16.00
Old steel rails, less than 3 ft	13.50 to 14.00
Relaying rails, standard section, subject to inspection	23.50 to 24.00
Old carwheels	15.50 to 16.00
Heavy melting steel scrap	13.25 to 13.75
Frogs, switches and guards cut apart	13.25 to 13.75

Per Net Ton.

Iron fish plates	$12.50 to $13.00
Iron car axles	22.50 to 23.00
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.00 to 12.50
Railway springs	11.00 to 11.50
Locomotive tires, smooth	12.50 to 13.00
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	7.00 to 7.50
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.00 to 10.50
Pipes and flues	7.50 to 8.00
Railroad sheet and tank scrap	7.25 to 7.75
Railroad grate bars	9.50 to 10.00
Machine shop turnings	8.75 to 9.25
Bundled sheet scrap	7.50 to 8.00

San Francisco

SAN FRANCISCO, CAL., January 28, 1913.

Jobbing business for January has been better than in the same month for several years. Specifications sent to the mills are also comparatively large, though the movement is still below the record of the fall months, when most buyers were putting in stock. Consuming requirements in nearly all departments are larger than usual at this season, general construction work having suffered little interruption. Crop prospects, except in citrus fruits, are now encouraging. Business in the south has so far been well maintained, and while the outlook there is uncertain the future will depend largely on the extent to which financial support can be obtained. Merchants are well stocked, and are keeping their normal requirements covered for many months in advance.

Bars.—Specifications for soft steel bars are mostly of a sorting-up nature, as the larger buyers have a heavy tonnage in store. The aggregate volume is fairly large, however, the demand from small consumers having increased materially in the last fortnight, while the larger manufacturers are busier than usual at this season. The demand for reinforcing bars is extremely heavy, with a steady run of inquiries from the building trade and prospects of additional orders for harbor work, etc. Some of the coast mills are preparing to increase their capacity. Prices are firmly held, soft steel bars in jobbing lots, from store, San Francisco, being quoted at 2.75c., and iron at 2.65c.

Structural Material.—Notwithstanding the comparatively large tonnage ordered in various coast cities since the first of the year, many important jobs are still in prospect, and fabricators look for unusual activity in the spring. The principal difficulty is in getting the plain material to handle the work offered. The Board of Public Works has been authorized to take

figures on the city hall construction, and an award of the general contract for the U. S. Sub-Treasury is expected within the week. The Exposition Company is taking bids on a small job for a freight station. The Central Iron Works has the contract for the Mensor Hotel at Geary and Jones streets, and the Ralston Iron Works for a 10-story building at Sutter and Market streets. The Llewellyn Iron Works has the Broadway department store contract at Los Angeles, and figures are being taken on the John A. Roebling's Sons warehouse in that city. An award is expected shortly on a large office building at Fresno, Cal., and plans are under way for a 12-story office building at Fourteenth and Franklin streets, Oakland. Plans are about ready for a steel frame hotel at Geary and Larkin streets, this city. It is reported that the Oregon-Washington Railroad & Navigation Company is about ready to build a steel bridge at Tacoma, Wash., to cost about $350,000.

Rails.—A good sized order for grooved rails has come from Los Angeles, and the same interest is figuring on a lot of special work. There is a good general demand for light rails up to 40-lb., though single orders are moderate and scattered over a wide territory. Figures are being taken on a lot of rails for the local harbor belt road. The California, Shasta & Eastern is preparing to extend its line. Several prospective interurban inquiries have not yet come out, and some large orders are expected for timber development projects.

Sheets.—The distributive movement is unusually active, and specifications continue heavy from both merchants and manufacturers. Manufacturers of riveted pipe expect fully as much business as last year, and find some difficulty in getting supplies for contracts on hand. It is expected that this material will be used for the Exposition waterworks, requiring 9 miles of 6 to 16 in. pipe for high pressure and 12 miles of 4 to 12 in. for service.

Plates.—The jobbing movement is limited, but more large tank work is coming up than for some time. The Associated Oil Company has adopted plans for a new refinery in Contra Costa County, and is preparing to build large distributing tanks at various points. Figures have just been taken for three large oil tanks for the Government station at Pearl Harbor, T. H. There is a fair demand for shipbuilding material, and it is expected that the Mare Island Navy Yard will soon begin work on a new collier.

Merchant Pipe.—Specifications are still light but all that could be expected in view of the heavy stocks held by merchants. Distributive business with the regular steel merchants is extremely active, though the plumbing supply firms note some curtailment. A gradual betterment is noted in the oil fields, and several inquiries are coming out for waterworks, the city of Los Angeles having taken figures recently on 71,500 ft. of ½ to 2 in. galvanized pipe. Some interest is taken in the Exposition inquiry, though it is doubtful whether welded pipe will be used.

Cast-Iron Pipe.—The large orders expected for some time are now coming out. The United States Cast Iron Pipe & Foundry Company has taken the Redlands contract as well as a small order for 48-in. pipe for Seattle, Wash. Small orders are numerous, and a considerable tonnage is still being ordered for gas systems and power plant construction.

Pig Iron.—General foundry work is fairly active, but melters either have large stocks on hand or are well covered by contracts, and are buying on a rather limited scale. A large tonnage of Southern foundry and American-Scotch is arriving on first-quarter contracts. No foreign iron is coming in at present, but importers still offer a fair assortment of brands from store, quoting $26.50 per net ton for No. 1 Lackenby or Jarrow, and $29 for No. 1 Glengarnock. No. 2 Southern foundry iron is quoted as before at $24.60 per gross ton for prompt shipment, and $25.10 for second quarter.

Coke.—A cargo of foreign coke now discharging will probably be the last to arrive for about five months and importers are accordingly firm in regard to prices, quoting $15 to $15.50 per net ton, ex yard. Business is quiet, however, several foundries having purchased in excess of requirements, and some odd lots have been offered for resale. Southern foundry coke is still quoted around $12 per net ton.

Old Material.—Most descriptions of scrap are moving well, with an active demand from coast interests. Sales are reported of 500 tons of steel melting scrap in this vicinity and a similar amount of wrought-iron scrap to a southern California mill. Cast-iron scrap is very scarce, and dealers predict higher prices, though all values so far are within the former range. Quotations are as follows: Cast-iron scrap, per net ton, $15.50; steel melting scrap, per gross ton, $12.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

The Union Iron Works is having plans drawn for a new concrete hospital building.

The Pacific Coast Steel Company is adding a new open-hearth furnace to its plant at South San Francisco and on its completion will start work on another. A new building, 100 x 200 ft., with crane equipment, is being added to the shipping department.

The Brode Iron Works, structural steel, has moved from Howard street, opposite New Montgomery, to a new corrugated iron building at 31-37 Hawthorne street.

The German Iron Market

Satisfactory Conditions Continue

BERLIN, January 23, 1913.

The position of the iron trade shows few changes. Advances have not been reported from any quarter, but the situation remains otherwise favorable. The Steel Works Union gave out to-day, at its regular monthly meeting, a résumé of the trade position of which the following is a condensation:

In semi-finished steel the calls for delivery from home consumers remains very satisfactory, and the volume of orders in hand is considerably higher than a year ago. The foreign trade in these products continues satisfactory; British consumers are still well employed. A certain caution recently observed in making new orders, due to political uncertainty, will give way to a renewal of confidence and a good improvement in business may be looked for as soon as peace has been secured definitely. In heavy rails and other track supplies the Prussian railroad authorities have placed supplementary orders for the current year, bringing the orders in such products to 54,000 tons above the amount in hand a year ago. The foreign trade in heavy rails continues good, and further substantial orders have been taken at satisfactory prices. Specifications on rails for mines already ordered are coming in briskly, as they have for a long time; the foreign markets are taking satisfactory amounts at better prices. Business in grooved rails is very good for both home and foreign markets, and the mills are sold to their full capacity till the end of September. The home trade in structural shapes is pronounced satisfactory, considering the season and the unfavorable position of the money market; as political and monetary conditions improve, a better trade may be looked for. Hitherto there has been no relaxation of the demand abroad, particularly in the English and oversea markets. So far as appears at this moment, there was no discussion of price changes at to-day's meeting.

It has helped the general situation considerably that the Prussian railroads are at last able to handle all the traffic offered in the western coal and iron region. The demand for coal cars, in particular, is heavier than ever before, and new shipment records have recently been made.

According to a report on the hardware trade, conditions are in the main satisfactory. Shops producing supplies for the railroads, for construction and shipyards are unusually busy, being hardly able to handle their orders, notwithstanding the fact that they have largely added to their producing capacity in recent years. Manufacturers of screws and nuts report a considerable improvement in business, particularly for the export trade in the smaller grades. Trade in files is good; the shops are better employed, and prices are now rather satisfactory. In builders' hardware, trade looks promising, notwithstanding the rather quiet position of the building business. Tools show a steady improvement and are expected to do still better later on. Machine-tool shops have work in hand for several months; increased foreign orders have greatly encouraged the manufacturers.

This week the Belgian market sends in news of an advance in light beams for the home trade of 2.50 francs, and the same amount for basic steel bars. Semi-finished steel for export was also raised 1 to 2 shillings.

British Iron Market Looking Better

More Activity in Semi-Finished Steel—Tin Plate the Weak Feature

(By Cable)

MIDDLESBROUGH, ENGLAND, February 5, 1913.

Late activities in the Cleveland speculative market point to advances. There is a little more doing in semi-finished material, but tin plates are off, as noted in the table below. In this connection it is reported that the Standard Oil Company is willing to pay 15s. for the so-called oil sizes, which include 14 x 18¾-in. coke tin plates, 124 sheets, 110 lb. per box, and 14 x 19¼-in. coke tin plates, 120 sheets, 110 lb. per box.

Guest, Keen & Nettlefolds, Ltd., Birmingham, booked 22,000 tons of rails for South Africa and the German Steel Works Union has sold a good amount of steel joists for the Pacific coast. The stocks of warrant iron total 233,958 tons against 237,165 tons last week. We quote as follows:

Cleveland pig iron warrants (closing Tuesday) 65s. 2d., against 65s. 3½d. one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 65s. 9d.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 15s., a decline of 2s. 6d.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s. 6d.

German basic steel bars, f.o.b. Antwerp, £6 2s.

Steel bars, export, f.o.b. Clyde, £8 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 7s. 6d.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 9d., a decline of 3d.

Buffalo

BUFFALO, N. Y., February 4, 1913.

Pig Iron.—Sales for the week aggregated probably 7000 to 10,000 tons of all grades. The demand for shipments on contracts continues at high pressure. In some instances special offerings of foundry iron have been reported at a concession in price. The range of quotations made by some producers is therefore a little lower than has been current for the past few weeks, being $16.50 as the minimum for gray forge to $17.75 as the maximum for No. 1 foundry. Other producers maintain a somewhat higher range. We revise the schedule slightly, as given below, for last half delivery, to cover these conditions and make quotations nominally as follows:

No. 1 foundry	$17.25 to $17.75
No. 2 X foundry	17.00 to 17.50
No. 2 plain	17.00 to 17.50
No. 3 foundry	16.75 to 17.25
Gray forge	16.50 to 17.00
Malleable	17.25 to 17.75
Basic	18.00 to 18.25
Charcoal, regular brand and analysis	18.00 to 19.00
Charcoal, special brand and analysis	21.75

Finished Iron and Steel.—With some mills, specifications received in January were in excess of shipments, although shipments ran almost to maximum proportions, and with these mills the situation as regards deliveries has consequently not improved. New buying has been of moderate volume, owing to the limited tonnage which the mills can accept. Such new business as is being taken is principally for delivery at the mill's convenience, which is beyond the first half. All material on which early delivery is required has to be placed with warehouses at premium prices. In wire products inquiry continues to be of good volume, although showing same shrinkage, due to the large tonnage entered the latter part of last year. Mills are crowded with orders and have business on their books for several months to come, regardless of further bookings. Rods are firm at $30, Pittsburgh, and are scarce, it being impossible to get prompt deliveries. Sheets are active and firmly held at 2.35c. for black and 3.50c. for galvanized. Fabricated structural material is showing increased life, and contractors are realizing that contracts for spring and summer construction must be placed promptly, as four to six months is now required for delivery. Bids opened today on the Otis Elevator Company's foundry building in this city, requiring 770 tons, showed the American Bridge Company to be the low bidder, delivery to be made in five months. This latter company has received contract for 300 tons for an additional factory building for the Eastman Kodak Company, Rochester, and the Lackawanna Bridge Company has taken contract for the new power house for the Rochester Railway & Light Company, 1500 tons. The McClintic-Marshall Construction Company has been awarded contract for the steel for the Morrow Mfg. Company's building at Elmira, about 200 tons. Plans are out for an extensive manufacturing plant to be built at Thorold, Ont., by the Beaver Board Company of Buffalo, requiring a large tonnage of structural and concrete reinforcing steel.

Old Material.—With the exception of borings, in which commodity there has been marked activity, and old car wheels, in which there has been a fair amount of business, the scrap market has been dull with light transactions. Contract material is being accepted by consumers in good volume. The price of clean cast borings has advanced, owing to the exceptionally active local demand. Dealers' prices, per gross ton, f.o.b. Buffalo are as follows:

Heavy melting steel	$14.25 to $14.75
Boiler plate, sheared	15.50 to 16.00
Busheling scrap, No. 1	12.25 to 12.75
Busheling scrap, No. 2	10.25 to 10.75
Low phosphorus steel	17.00 to 17.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	17.00 to 17.50
Old iron axles	24.00 to 24.50
Old car wheels	15.75 to 16.25
Railroad malleable	13.25 to 13.75
Locomotive grate bars	11.00 to 11.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	10.00 to 10.50
Wrought iron and soft steel turnings	8.25 to 8.50
Clean cast borings	8.75 to 9.00
Bundled tin scrap	18.00

New York

NEW YORK, February 5, 1913.

Pig Iron.—The market grows dulier. While it is understood that some melters of foundry iron will need to buy additional lots for the second quarter, the fact that they are supplied for from two to four months seems sufficient for the present. On the other hand, while producers are shipping iron as fast as made, and most of them will have no occasion to look for business for some time, it is evident that the wait for new buying is not endured with entire equanimity in all quarters. It is quite like other intervals of quiet in that so little business is offering that concessions are not thought of as a way of coping with the situation. The reduction in shipments from Port Henry iron mines last week, due to the strike, has not been a measureable factor; at least, it has not caused any lessening of pig iron output. Some of the buying reported by Buffalo furnaces has been for the second half of the year, but few consumers are showing any interest in far forward purchases. With conditions as near like those of last week as can be, we continue quotations as follows for Northern iron at tidewater: No. 1 foundry, $18.75 to $19; No. 2 X, $18.25 to $18.50; No. 2 plain, $18 to $18.25. Southern iron is quoted at $18.50 to $19 for No. 1 foundry and $18 to $18.50 for No. 2.

Structural Material.—Little contracting for fabricated material has been going on, and this has undoubtedly accentuated the activities of local fabricators and erectors, so that it is expected some of the large work soon to fall will go at concessions over recent prices. To be added to pending projects may be mentioned the building for the Lord & Taylor store, Fifth avenue, now up for figures, which will involve 5000 to 6000 tons. The Boston & Maine has another bridge inquiry, this at Lynn, Mass., for 200 tons. It is expected that the Pennsylvania Steel Company will supply the 12,000 tons required for the elevated railroad work in Queens Borough and that Post & McCord will erect the 4000 to 5000 tons for the Loose-Wiles bakery. Plain material still obtains 1.76c., New York, for mill shipments for delivery in two to three months, but 1.66c., New York, for delivery in the third quarter. From store the price is 2.25c., New York.

Plates.—Car buying continues to be the active feature of the plate market and plate mills are still running at full capacity with no diminution in bookings.

The orders for the Harriman Lines are about all closed. The Bettendorf Axle Company has orders for about 4800 cars and will also supply the underframes for 1300 more; the Pullman Company is expected to get 4800 to 5600 cars; the Pressed Steel Car Company, about 3000 steel cars; the American Car & Foundry Company, about 2500 box cars and the remainder, it is thought, will go to the Standard Steel Car Company. The Norfolk & Western has placed 1000 hopper cars with the Pressed Steel Car Company and the same number, together with 250 flat cars, with the American Car & Foundry Company. Further car building by this road is expected because it is understood that it has contracted for specialties for as many as 6500 to 6800 cars, many of which may be built in its own shops. The Mount Vernon Car Mfg. Company is to build 500 gondolas for the Louisville & Nashville; the Baltimore & Ohio is expected to come in the market for at least 1500 hopper cars, and the Illinois Central in addition to 61 passenger equipment cars is down for 500 stock, 300 refrigerator, 500 fruit and 800 furniture cars. The Pullman Company is to build 50 passenger cars for the Rock Island. Other passenger equipment in the market not already noted includes 50 cars for the Metropolitan Elevated Railroad, Chicago; 6 postal cars for the Northern Pacific; 45 storage battery cars for the New York Railways; 14 for the Central of Georgia and 20 for the Atlantic Coast Line. General quotations for plates remain 1.66c., New York, for mill shipment in the third quarter, and 1.76c. for sheared plates and 1.81c. for universal plates for the first half.

Iron and Steel Bars.—Specifications continue heavy for steel bars but there has been a slowing up in bar iron, though not so much perhaps as the mills would like. Considerable inquiry is in the market for corrugated bars and much of this from jobbers whose stocks are low and who are anticipating early heavy demands from contractors. Steel bars remain at 1.40c., Pittsburgh, or 1.56c., New York, delivered at the convenience of the mill, which in the case of some sizes means not more than three months, owing to a particular mill's not being heavily sold, but they remain 2.10c. from store; shipments in one or two months go at prices between the extremes, though this business does not total very much. Refined iron bars are quoted at 1.75c. to 1.80c., New York, although there are indications that the lower price has lately been shaded, and from store are 2.15c.

Cast Iron Pipe.—Sales to private buyers have been somewhat larger this week. In this respect business is showing somewhat more life. Beverly, Mass., will open bids for 740 tons February 11, and Worcester, Mass., 2630 tons February 18. No other public work of importance is before the trade at present. Prices are not quite so firmly held as they were, probably being influenced by the slight weakening in pig iron prices. Quotations on carload lots of 6-in. are $25 to $26 per net ton at tidewater.

Old Material.—Business is slow, as large consumers show no disposition to take any considerable quantities of old material. The tendency of prices under such circumstances is downward. Dealers' quotations are as follows per gross ton, New York and vicinity, but buyers who must have a carload or two for prompt shipment sometimes pay as much as 50c. per ton more than the prices here stated:

Old girder and T rails for melting	$11.50 to $12.00
Heavy melting steel scrap	11.50 to 12.00
Relaying rails	22.50 to 23.00
Rerolling rails	14.00 to 14.50
Iron car axles	24.00 to 24.50
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	12.00 to 12.50
No. 1 yard wrought, short	11.50 to 12.00
Light iron	5.00 to 6.00
Cast borings	8.00 to 8.50
Wrought turnings	8.50 to 9.00
Wrought pipe	10.25 to 10.75
Old car wheels	15.00 to 15.50
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Malleable cast	11.00 to 11.50

Ferroalloys.—Quotations for 80 per cent. ferromanganese, both spot and forward delivery, are nominal at $65, Baltimore, although a few small resale lots for prompt delivery have been purchased as low as $64. The market is quiet, with inquiries probably not aggregating 100 tons. Quotations for 50 per cent. ferrosilicon, which also is quiet, are unchanged at $75, Pittsburgh, for carloads; $74 for 100 tons, and $73 for 600 tons and over.

Metal Market

NEW YORK, February 5, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
		Electro-	Tin,	New	St.	New	St.
Jan.	Lake.	lytic.	New York.	York.	Louis.	York.	Louis.
30	16.50	16.25	50.10	4.35	4.20	6.80	6.65
31	16.50	16.25	50.15	4.35	4.20	6.80	6.65
Feb'y.							
1	16.50	16.25	.....	4.35	4.20	6.80	6.65
3	16.50	16.25	49.00	4.35	4.20	6.75	6.60
4	16.50	16.25	49.20	4.35	4.20	6.75	6.60
5	16.50	16.25	48.75	4.35	4.20	6.75	6.60

Copper is lower and quiet, with the sentiment bearish. Tin has declined heavily and large sales have been made. Lead has a slightly stronger tone. Spelter is lower and very dull. Antimony is quoted lower.

New York

Copper.—The sentiment in copper is generally bearish in tone. The market has been exceedingly dull since the last report, with buyers disposed to wait until the very last moment before placing orders. There is considerable talk of the price going to 15c., which, it is declared, would set in motion a good buying movement, but all of this is conjecture only. Lake copper stands at 16.50c., cash New York, and for electrolytic prompt shipment, 16.25c., cash New York, is generally asked but it is declared that not all will sell at that price. On the other hand, there is said to be some metal in second hands available for February delivery which can be had at 16c. With March copper there is no question that it can be had at 16c., cash New York, and April and May can be had at a still lower price. Metal for these months was offered yesterday at 15.60c., cash New York. Since January 29 speculative copper in London has declined between £2 and £3. The London price to-day is £67 for spot and £66 17s. 6d. for futures. The exports this month amount to 6822 tons. Manufacturers of sheet copper reduced the price 1c. per lb. February 1, making the base price 22c. The list on copper bottoms has been changed and the base price is now 28c. for 16 ounce instead of 14 ounce as formerly.

Copper Averages.—The Waterbury average for the month of January was 17c. The average New York price for Lake copper, based on daily quotations in *The Iron Age*, was 16.08c. and for electrolytic, 16.79c.

Pig Tin.—The week has been eventful in tin and much lower prices prevail, though the causes for the decline are not altogether clear. The latter part of last week only a little business was done and that was mostly between dealers. On Monday there was considerable activity and yesterday a very large business was done, probably 600 tons changing hands. A decline in London on Monday, which the trade was unable to understand, stimulated buying here. Yesterday, for reasons which are not apparent to the trade, one firm alone went on the floor of the Metal Exchange and sold 335 tons of tin for delivery as far ahead as August at remarkably low prices. The tonnage sold and low prices accepted created no little anxiety and a feeling that the sellers might have some advance information. Since January 29 tin has declined £10. While the statistics for January were regarded as unfavorable, they had been anticipated and it is believed that the declines are due to other and perhaps stronger influences. In January United States deliveries totaled 3700 tons and the total visible supplies at the end of the month were about 14,000 tons, an increase of about 2700 tons. tons. The price in London to-day is £222 10s. for spot and £219 15s. for futures. The arrivals this month total 780 tons and there is afloat 3510 tons. The price of tin in New York to-day is 48.75c., having again followed the London market downward.

Lead.—The market is practically unchanged, although there is a slightly firmer tone and there are unconfirmed rumors of 4.22½c., St. Louis, having been obtained. The metal can be obtained, however, at 4.20c., St. Louis, and the New York price continues at 4.35c.

Spelter.—The trend of spelter toward lower prices has continued since the last report and the market can be described as dull and uncertain at 6.75c., New York, and 6.60c., St. Louis. Foreign spelter is still a factor in the market and the feeling that it may become still more so through tariff reduction is disquieting to the trade. The average price paid for brass mill spelter in the Naugatuck Valley in January was 7.56c.

Antimony.—This metal is without feature except that its declining tendency has continued, and it is now quoted at 9.45c. to 9.75c. for Cookson's, 9c. to 9.25c. for

Hallett's, and 8.25c. to 8.50c. for Chinese and Hungarian grades.

Old Metals.—Owing to absence of buying, it is difficult to gauge the market. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	15.50 to 15.75
Copper, heavy and wire	15.25 to 15.50
Copper, light and bottoms	14.25 to 14.50
Brass, heavy	9.75 to 10.00
Brass, light	7.75 to 8.25
Heavy machine composition	13.25 to 13.50
Clean brass turnings	9.00 to 9.50
Composition turnings	12.00 to 12.50
Lead, heavy	4.25
Lead, tea	4.00
Zinc, scrap	6.00

Chicago

FEBRUARY 4.—After a sharp break copper has recovered somewhat in firmness, although there has been a net loss in quotations. Spot copper is scarce and commands better than the market for forward delivery. Tin prices have been subject to considerable fluctuation and are lower than the quotations of a week ago. The spelter market is more or less demoralized and prices cover a wide range. We quote as follows: Casting copper, 16.50c. to 16.75c.; Lake, 17.50c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 50.50c.; small lots, 52.50c.; lead, desilverized, 4.30c to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.75c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is $9, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 13.25c.; copper clips, 14.25c.; red brass, 12.75c.; yellow brass, 9.75c.; lead pipe, 4c.; zinc, 5.25c.; pewter, No. 1, 33c.; tinfoil, 38c.; block tin pipe, 43c.

St. Louis

FEBRUARY 3.—The market has been rather quiet. Spelter has been noticeable for its very sharp recession. Quotations to-day are: Spelter, 6.60c.; lead, 4.20c.; Lake copper, 16.85c. to 17.10c.; electrolytic copper, 16.75c. to 17c.; tin, 49.60c. to 49.85c.; antimony, Cookson's, 10.10c. In the Joplin ore market there was a sharp decline in zinc blende; prices and offerings went as low as $45 to $50 per ton for 60 per cent., while the choice lots brought only $53. The shading in prices has been due to heavy importations of English spelter. The declines were sharper in the second grades than in the choice lots and operators are considering the advisability of a shutdown until the price improves, though this is not regarded as immediately impending. The best price paid for calamine was $30, while the 40 per cent. ranged from $24 to $26. Lead ore was in stronger demand, the price most generally paid being $53 for 80 per cent., although there were reports of sales at $54. In the miscellaneous scrap metal market there was little feature. We quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; tinfoil, 36c.; pewter, 25c.; zinc, 4c.; lead, 3.50c.; tea lead, 3c.

Stockholders Buy Allis-Chalmers Plants

J. H. McClement, chairman of the reorganization committee of the stockholders of the Allis-Chalmers Company and representing the buyers' committee, purchased the Milwaukee and West Allis properties of the company at the sale held in Milwaukee, Wis., on February 3. The price paid was $2,500,000 and this bid was the only one received by Gerry W. Hazelton, the special master in charge of the affairs of the bankrupt company. The sale was made to procure money with which to pay interest on the outstanding first mortgage bonds in the receivership. Notice was served by attorneys representing an interest which opposed the appointment of Otto H. Falk and Daniel W. Call as receivers in May, 1912, that if the receivership should be set aside by the courts the sale would not be effective and this was assented to.

Alton Steel Company's New Plant.—Erection of the plant of the Alton Steel Company, Alton, Ill., is progressing at a rate which insures the completion of the finishing mills in June. The work on the open-hearth furnaces and billet mill is not so far along and it is not anticipated now that it will be possible to make steel by that time. All of the foundation work is well under way and the erection of the superstructures began this week. An endeavor is being made to complete the plant in time to furnish cotton ties for this year's crop.

Iron and Industrial Stocks

NEW YORK, February 5, 1913.

Such improvement as has occurred in stock prices the past week has been due to special causes. American Can advanced sharply because of arrangements being made by the issue of bonds to pay off more rapidly the accumulated dividends on the preferred. Colorado Fuel also advanced, with rumors that the accumulations on the preferred would probably be paid in the near future. International Harvester stock rose as a result of the impression that the incorporation of a company to take over the foreign properties would carry with it some benefit to stockholders of the parent company. Other stocks sympathized with the advancing prices shown in these stocks and the general range for the week was therefore higher. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.	39 - 46⅞	Nat. En. & St., com.	17½ - 19¼
Am. Can, pref.	124½-129½	Pressed Steel, com.	33¼ - 34
Am. Car & Fdy., com.	53¼ - 54	Pressed Steel, pref.	99½-100¼
Am. Car. & Fdy, pref.	116	Railway Spring, com.	32¾
Am. Loco., com.	40 - 41⅜	Railway Spring, pref.	99⅜
Am. Loco., pref.	105½-105⅞	Republic, com.	24⅜ - 28¼
Am. Steel Foundries	35 - 40½	Republic, pref.	86 - 89⅛
Bald. Loco., com.	48½ - 49	Rumely Co., com.	87 - 90
Bald. Loco., pref.	102⅝-104¼	Rumely Co., pref.	98 - 98¼
Beth. Steel, com.	38 - 39¾	Pipe, com.	16 - 16¾
Beth. Steel, pref.	66 - 70	Pipe, pref.	56½ - 57
Case (J.I.) Co., pref.	103½-103⅝	U. S. Steel, com.	63¼ - 66
Colorado Fuel	35½ - 41½	U. S. Steel, pref.	108¾-110¼
Deere & Co., pref.	99⅝-100⅛	Westinghouse Elec.	72½ - 75
Emer-Brant, com.	66 - 66¾	Am. Ship, com.	54
Emer-Brant, pref.	97½ - 98¼	Chic. Pneu. Tool	50¼ - 51¼
General Electric	141¾-143	Cambria Steel	50¾ - 51¾
Gr. N. Ore Cert.	38¼ - 40½	Lake Sup. Corp.	30
Int. Harv., com.	111½-115⅜	Warwick	10½ - 10⅞
Int. Harv., pref.	114½-116	Crucible Steel, com.	16¼ - 17
Int. Pump, com.	15½ - 16⅛	Crucible Steel, pref.	94 - 95¼
Int. Pump, pref.	66 - 67¼	Harb. Wk. Ref., com.	51
Lackawanna Steel	46⅜ - 49⅞		

Dividends Declared

The Pittsburgh Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The Inland Steel Company, regular quarterly, 1¾ per cent., payable March 1, and an extra of 3 per cent., payable May 1. A year ago 3 per cent. extra was declared.

The International Harvester Company, regular quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The General Fire Proofing Company, 7 per cent. on the common stock for the year 1913, payable quarterly, commencing April 1.

The La Belle Iron Works, ½ of 1 per cent. on the common stock, payable January 31.

The M. Rumely Company, initial quarterly, 1½ per cent. on the common stock, payable March 3.

The Republic Iron & Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable April 1.

Sale of Southern Iron & Steel Company Properties

James Bowron as trustee sold at auction at Birmingham, Ala., on Friday, January 31, the properties of the Southern Steel Company, under the order of a referee in bankruptcy. Edward H. Buss and Daniel Holman, New York, representing the holders of more than 90 per cent. of the outstanding bonds of the company, bid in the properties on behalf of a reorganization committee, of which J. W. Platten, New York, is chairman. The properties were offered in four parcels, on which the aggregate of the prices bid was $1,530,000. The appraisal of the properties was something less than $5,000,000, and they were bought subject to a mortgage to the United States Mortgage & Trust Company, New York.

The Standard Steel Company is the name under which the business will be reorganized. On February 3 the sale was confirmed by the referee in bankruptcy at Birmingham, the assurance being given by the reorganization committee that unsecured interests would have the same opportunity to participate in the reorganization plans as those who are secured.

The billet mill of the Republic Iron & Steel Company connected with the open-hearth plant at Lansingville, Youngstown, Ohio, produced 26,636 tons in January. Eight open-hearth furnaces were operated last month. The 14-16 in. bar mill at this plant produced 8897 tons in January.

Personal

M. J. Madison, formerly assistant superintendent of the Morden Frog & Crossing Company, Chicago, has become superintendent of the plant of the Weir Frog Company, Cincinnati, Ohio.

Howard M. Hanna, Jr., who is one of the new directors of the Republic Iron & Steel Company, is a member of the firm of M. A. Hanna & Co.

John M. Bush, who was superintendent of the Ashland mine at Ironwood, Mich., in the last few years of its operation by the Cleveland-Cliffs Iron Company, goes to Iron River, Mich., as general superintendent of the company's properties in that district.

J. G. Garrard, at present connected with the foundry of the Griffin Wheel Company at Chicago, has resigned to accept the position of superintendent of the foundry of the Northwestern Malleable Iron Company, Milwaukee, Wis.

A. J. Babcock, associated with Manning, Maxwell & Moore in charge of the Chicago branch, has been appointed vice-president of that company with offices in New York City.

The holdings of C. T. Childres in the Galesburg Cornice Works, Galesburg, Ill., have been purchased by T. M. Cox.

F. R. Fortune, formerly with the Westinghouse Electric & Mfg. Company, is now vice-president and general manager of the Commonwealth Electric & Supply Company, 919 Liberty avenue, Pittsburgh.

Isaac A. Brown, for 20 years superintendent of labor and transportation at the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, has resigned, effective February 1.

Charles M. Wales, for over 20 years representative in New York of the Cleveland City Forge & Iron Company, Cleveland, Ohio, has resigned from that connection and will represent the Otis Steel Company, Cleveland, and the Titusville Forge Company, Titusville, Pa. These two companies give him the agency for steel castings ranging from 1 to 150,000 lb. each and for hammered or pressed iron, open-hearth and nickel steel forgings. He will continue to be located at 11 Broadway, New York.

William B. Chase, superintendent of the Cincinnati Gear Cutting Machine Company and the Cincinnati Shaper Company, Cincinnati, Ohio, arrived in New York February 2, after a business trip of two months in Europe.

L. Gerard Smith, formerly of the Safety Car Heating & Lighting Company, 2 Rector street, New York City, has been appointed general manager of Spindler & Deringer, workers in brass, iron, steel and aluminum, Colgate and Mercer streets, Jersey City, N. J.

Nathan B. Payne, who has been associated with Manning, Maxwell & Moore, New York, for several years, has accepted the position of manager of sales with the Davis-Bournonville Company, manufacturer of oxy-acetylene welding and cutting apparatus, 90 West street, New York, beginning February 1.

Charles Burgess, president Cyclops Steel Company, Titusville, Pa., has gone to California for the winter.

C. L. Miller, general manager American Steel & Wire Company, Pittsburgh, who has been in ill health for some time, has been granted a six months' leave of absence. He is now in California.

Frank C. Pund, formerly in the sales department of the Republic Iron & Steel Company, has been elected vice-president of the D. T. Williams Valve Company, Cincinnati, succeeding the late D. M. Forker.

Norman B. Chace, general superintendent Cincinnati Shaper Company, has returned from a business trip to Europe.

Frank M. Henderson, formerly cashier of the Bridgeport National Bank, Bridgeport, Ohio, has been elected treasurer of the new Wheeling Sheet & Tin Plate Company, Wheeling, W. Va., and will assume his duties March 1.

A. F. Huston, president Lukens Iron & Steel Company, Coatesville, Pa., has gone to Palm Beach, Fla. About the middle of March the trip South will be extended to Panama by the way of Havana.

Obituary

R. H. Wolff

Information has come to friends of Raphael H. Wolff of his sudden death in a sanatorium near Berlin, Germany, January 23. Mr. Wolff was long a well known figure in the iron trade of the United States and also had a wide acquaintance among iron and steel manufacturers in Germany. He came of a family of wire manufacturers. His father, until a few years ago, then over 90 years of age, owned and operated a wire mill at Neheim on the Ruhr, Westphalia, which has been in the family for generations. Mr. Wolff came to the United States in 1870, and his first employment was with Pratt & Whitney, Hartford, Conn. For many years he was an importer of iron and steel in New York and was a pioneer in the importation of wire rods and steel billets. He established a plant at 117th street and the Harlem River, New York, where he was engaged for many years as head of R. H. Wolff & Co., Ltd., in the manufacture of cold rolled strip steel and of high grade wires, including piano wire. He also engaged in the manufacture of bicycles in the period of greatest activity in that industry, manufacturing the Fox wheel. He disposed of his wire business in 1902 to the Washburn Wire Company, Phillipsdale, R. I. Later he became European representative of the Crucible Steel Company of America, with headquarters at Hamburg, Germany, and soon built up an important business in spite of hampering conditions which finally led him to resign. After a careful study of the field of electrometallurgy Mr. Wolff became the representative in the United States of Dr. P. Heroult, inventor of the Heroult electric furnace, and was an eager and persistent pioneer in the electric refining of steel. He conducted the negotiations which resulted in the acquisition of the American rights in the Heroult furnace to the United States Steel Corporation. He was also largely instrumental in the establishment of the ferrosilicon plant of the Electro-Metals Ltd., at Welland, Ont.

EDWARD BOLTER, secretary and treasurer of A. Bolter's Sons, Chicago, structural steel fabricators, died January 27 at Henrotin Hospital, following an operation for appendicitis, aged 51 years. His brother, Joseph C. Bolter, is president of the company, which has grown from the business established by A. Bolter in 1850.

KARL WITTGENSTEIN, one of the leading steel manufacturers of Austria, who has often been referred to as the "Austrian Carnegie," died at Vienna recently aged 67 years.

JAMES B. HAMMOND, president Hammond Typewriter Company, whose factory is at 537 East Sixty-ninth street, New York, died suddenly at St. Augustine, Fla., January 27, aged 74 years. He was a native of Boston, was graduated from the University of Vermont in 1861, studied at the Union Theological Seminary and at the University of Halle, Germany, and during the Civil War was a correspondent for the New York Tribune. After the war he became interested in mechanical experiments and in 1880 patented the Hammond typewriting machine.

SILAS W. GOULD of Gould & Hedley, machinery manufacturers, Jersey City, N. J., died January 21 after a long illness, aged 69 years. He leaves a widow and three daughters.

CHARLES T. CHURCH, secretary and treasurer of the New York Wire & Spring Company, 586-588 Washington street, New York, died suddenly January 6.

At the annual meeting of the stockholders of the Guerber Engineering Company, Bethlehem, Pa., held January 28, the following directors were elected: A. N. Cleaver, F. C. Stout, William B. Myers, W. A. Wilbur, Joseph W. Adams, Charles M. Dodson, Alan C. Dodson, P. A. E. Guerber and R. P. Hutchinson. At the meeting of the directors subsequently held, R. P. Hutchinson was elected president and general manager; F. C. Stout, vice-president; W. B. Myers, treasurer, and Franklin H. Brunner, secretary. Mr. Hutchinson has for the past nine years been connected with the Carnegie Steel Company, coming to the Guerber Engineering Company from the Cleveland office.

Pittsburgh and Vicinity Business Notes

This month's meeting of the Pittsburgh Foundrymen's Association will be held at the Fort Pitt Hotel Monday evening, February 10. A. O. Backert, vice-president of the Penton Publishing Company, Cleveland, Ohio, will speak on "Foundry Publicity."

The Blaw Steel Construction Company, Pittsburgh, has placed an order with Charles T. Topping, Pittsburgh representative of the Ernst Wiener Company, for a complete industrial railroad equipment for its new plant at Hoboken, Pa.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has placed an order with the Jackson Engineering Company, Oliver Building, Pittsburgh, for a third-rail system, equipped with Peerless insulators, for supplying current to cranes on a new ore bridge in course of erection.

The Amsler Engineering Company, Wabash Building, Pittsburgh, has been awarded a contract for six gas producers and four combination gas and air reversing valves for the American Plate Glass Company, Kane, Pa.

Plans are being considered by the townspeople of Fallston, Beaver County, Pa., to join with the firm of C. C. & E. P. Townsend, nail manufacturers, in the celebration of the latter's one hundredth anniversary in 1916. The Fallston nail plant has never been out of the Townsend family, the third generation now carrying on the business. The firm lays claim to being the oldest industrial concern in western Pennsylvania, having continued in business without change of management, except from father to son, for 97 years. The works originally produced cut nails, but of late years its product has been changed to wire nails.

The Bessemer Gas Engine Company, Grove City, Pa., has completed its new power plant in which have been installed four 165-hp. and one 75-hp. Bessemer gas engines, direct connected to generators, and one 40-hp. Bessemer direct gas-engine-driven compressor for furnishing compressed air to the factory. This company has not only purchased the patterns of the Middleditch Company, Detroit, Mich., but also the patents of the Universal fuel feed from John and F. O. Petersen of Detroit, which make the use of kerosene possible in small engines. The company is marketing such engines in 2, 4 and 6 hp. sizes, and they will be built in single and double cylinders up to 40 hp.

The annual meeting of stockholders of the Standard Underground Cable Company, Pittsburgh, was held last week at which directors were re-elected as follows: B. F. Jones, Jr., Albert H. Childs, Louis W. Dalzell, John Moorhead, Jr., Joseph Wood, J. N. Davidson, W. A. Conner, Joseph W. Marsh and Frank A. Rinehart. The directors organized by electing Joseph W. Marsh, president and general manager; William A. Conner, vice-president; P. H. W. Smith, second vice-president; F. A. Rinehart, secretary and treasurer; John P. Bell, assistant treasurer, and C. M. Hagen, auditor.

The Aluminum Castings Company has abandoned its plant at New Kensington, Pa., and part of the equipment has been removed to its works at Cleveland, Ohio.

It is stated that the Hanlon-Gregory Galvanizing Company has secured possession of the foundry formerly operated by the Totten & Hogg Iron & Steel Foundry Company at Pittsburgh, and will occupy it as a galvanizing plant with a capacity for about 125 tons per day. A. J. Diebold is president; Thomas M. Gregory, vice-president; William J. Gregory, secretary; A. J. Loeffler, treasurer, and John A. Hanlon, general manager.

The seventh annual banquet of the local section of the American Institute of Electrical Engineers will be held in Pittsburgh February 8. Ralph D. Mershon, national president, is expected to be the honor guest. H. E. Longwell, consulting engineer of the Westinghouse Electric & Mfg. Company, will be toastmaster.

The contract for the lease by the State of Texas of the blast furnace at Rusk has been changed to conform with a ruling recently made by the Attorney General and has been signed by the principals. The lessee is shown to be D. M. Derringer, of Philadelphia, Pa., Mr. Derringer has also acquired extensive iron ore lands in eastern Texas.

Rogers, Brown & Co. Pictures in Newark

Over 200 members and guests of the Newark Foundrymen's Association, Newark, N. J., attended an exhibition of the Rogers, Brown & Co. motion pictures "From Mine to Molder," which was given under the auspices of the association at the foundry of Maher & Flockhart, 76 Polk street, Newark, on the evening of February 4. Through the courtesy of James Flockhart, the pictures were shown in a building which he recently acquired and which is to be used for one of the departments of his plant. The seats for the guests were improvised of foundry flasks and planks, and with various materials and implements of molding on every side the atmosphere was thoroughly in tune with the subject of the pictures. These were explained in detail by H. B. B. Yergason, of Rogers, Brown & Co., and both pictures and lecture met with the appreciative attention which they deserved. In the audience were 17 members of the class in foundry practice conducted by George Heggie at the Newark Technical School.

Prior to the showing of the pictures at 8 p. m. for the Foundrymen's Association, they were exhibited at 5.30 p. m. for the benefit of about 300 of the employees of Maher & Flockhart. The latter part of the evening was given over to refreshments and the playing of Scotch music, all of which had been arranged by Mr. Flockhart. Here again "local color" was much in evidence, as a similar method was followed in making seats and tables as was used before and various culinary operations were performed over two or three glowing brass furnaces. Rogers, Brown & Co. and Mr. Yergason were heartily thanked by vote for the display, and Mr. Flockhart himself received many expressions of appreciation for his ingenious hospitality. Many of his employees entered into the spirit of the occasion, and with great pride made themselves useful by directing guests to and from the foundry, as well as serving them inside.

Ferrotitanium Additions to Steel

Suggestions as to steelworks practice where ferrotitanium additions are made to rail steel has been printed and circulated by the Titanium Alloy Mfg. Company. In the case of basic open-hearth steel for rails and other products containing 0.30 carbon and upward the recommended procedure is as follows: Recarburizers and deoxidizers, except the electric silicon and titanium, to be added in the furnace before tapping. Electric silicon to be added after the steel begins to run into the ladle. Begin adding ferro carbon-titanium when the ladle is about one-fourth filled and complete just before the slag begins to run. Hold the steel in the ladle eight minutes before beginning to pour into ingot moulds. The recommended amount of ferro carbon-titanium for rail steel is such as will incorporate in the bath about 0.10 per cent. metallic titanium. It is suggested that silicon be kept down to 0.08 to 0.10 per cent in rail steel when ferro carbon-titanium is used.

In the case of Bessemer steel where one ladle is used the suggested specifications call for holding the blown metal at least two and a half minutes in the converter aftr the recarburizer is added. After the ferro carbon-titanium is added in the ladle the steel should be held at least three minutes before pouring. Some modification of this practice is provided for when two ladles—an intermediate ladle and a pouring ladle—are used in Bessemer practice.

The annual meeting of Abendroth Brothers, Port Chester, N. Y., was held January 28. The following officers and directors were elected: President, R. Jay Walsh; vice-president, C. B. Elmer; assistant to president, D. H. Roney; treasurer; A. R. Wilcox; assistant treasurer, John W. Diehl; comptroller, J. M. Ellis; secretary, D. H. Roney. Directors, R. Jay Walsh, C. B. Elmer, Charles Lanier, John W. Diehl, George Slater, D. H. Roney, A. R. Wilcox.

Landers, Frary & Clark, manufacturers of cutlery and hardware, New Britain, Conn., have re-elected the following officers: Charles F. Smith, president and treasurer; F. A. Searle, A. G. Kimball and J. F. Lamb, vice-presidents; J. N. Stanley and A. W. Kempton, assistant treasurers; M. A. Parsons, secretary.

The Machinery Markets

While there are no new big propositions before the machinery trade, business everywhere continues fair and the trade in the last week has been further reassured as to the healthiness of conditions by numerous orders which while small in themselves make a good total. New York has had continuance of scattered and miscellaneous demand and is awaiting railroad buying. In New York and elsewhere the mild winter has proved a stimulus to the ice machine industry. Philadelphia had an average amount of business which was made up of many single transactions. Cleveland has had an excellent demand for single tools and manufacturers are busy, while the inquiries for handling equipment are very good. Cincinnati has considerable railroad business in sight, automobile makers have been buying for replacement and January turned out to be the best first month of several years, although export orders have fallen off. The Central South, which has been hampered by floods, reports that business conditions are normal again and ice making machinery is unusually active. A satisfactory business of a general character was done in Birmingham. Several good sales are noted in Chicago, where trade has been very good for some time. Conditions have been rather quiet in St. Louis, where the chief demand is for replacements. Trade in Texas continues to be satisfactory, largely because of the many irrigation projects under way or contemplated. The Pacific coast has made some heavy sales of sawmill equipment and otherwise has been rather active.

New York

NEW YORK, February 4, 1913.

There has not been much change in market conditions in the last week. The fair run of miscellaneous business and the appearance of inquiries leading to small orders, many of which can be filled out of stock, continues. The trade is in a cheerful mood, though admitting that it can't precisely understand the delay on the part of railroads in closing against some of the large lists of requirements which were made known in December. January, which started poorly, turned out to be a fair month in volume of orders, as there was a decided betterment near its close. It was not, however, as good a month as November or December. The Allentown Rolling Mills, Allentown, Pa., recently purchased a few machine tools to complete the equipment of a new shop. A great deal of interest is being shown in purchases contemplated by the Pennsylvania Railroad. If the requirements of this road are made known all at once the list will be one of the largest of recent years. For some time the Pennsylvania has made a practice of buying piecemeal, but it is understood that a comprehensive list will soon be forthcoming. The absence of freezing weather which has continued so far this winter has caused manufacturers of ice and refrigerating machinery to be flooded with inquiries for ice-making machines ranging in capacity from ½ ton to 200 tons. Low temperature for a few days would cause many of these inquiries to subside, but as matters stand the open winter has given a good boost to the ice-machine industry.

The Federal Cooperage Company, Yonkers, N. Y., has let contract for the erection of a manufacturing building, 30 x 119 ft., two stories. J. B. Wagner, superintendent.

Swift & Co., Chicago, Ill., will erect and equip a modern plant on the site of their present buildings at Front and First streets at Newburgh, N. Y., of brick and concrete construction. The estimated cost is $200,000.

A factory, 220 x 225 ft., for the manufacture of cut glass is to be erected at Roosevelt avenue and Main road, Poughkeepsie, N. Y., by James H. Ackley of that city.

The Pine Valley Rug Company, Pine Valley, N. Y., has been incorporated by Charles K. Soper, A. Soper and H. Soper for the manufacture of rugs. The plant occupied by the company is to be enlarged and its manufacturing facilities increased.

Plans are being prepared for a cold storage plant with modern equipment to be built at Batavia, N. Y., by C. H. Teicher. The estimated cost is $50,000.

The Elixman Paper Core Company, Inc., Corinth, N. Y., has been incorporated with a capital stock of $100,000 to manufacture paper cores, etc. A plant for the purpose is being arranged for. T. Elixman and J. B. and K. Dayton, Corinth, are the incorporators.

The Syracuse Sash Weight Foundry, Inc., Syracuse, N. Y., has been incorporated by S. and R. Wiesman and L. and E. Plant to engage in a general foundry and machine shop business.

The Syracuse Chilled Plow Company, Syracuse, N. Y., has plans under consideration for additions and improvements to be made to its plant to cost approximately $200,000.

Bids are soon to be called for by the Board of Contract and Supply, Schenectady, N. Y., for the erection and equipment of a garbage disposal plant to be erected by the city from plans of W. Thomas Wooley, city engineer and architect. Estimated cost, $100,000. Frederick Johnson is clerk of the board.

Bids are being received by the Board of Water Commissioners, Jamestown, N. Y.—to be opened February 17—for a 6,000,000 gal. pumping engine, reciprocating or turbine.

The Lehigh Valley Railroad company is rebuilding the approach to its coal trestle on the Blackwell Canal at its Tifft Farm terminals and will install electric hoisting machinery.

The Otis Elevator Company is taking bids for the foundry building, 107 x 400 ft., structural steel and brick to be added to its Buffalo plant. Modern foundry equipment will be installed including electric traveling cranes, etc.

The American Radiator Company has let the general contract for the erection of a large addition to its Bond plant on Rano street, Buffalo, to cost $45,000. Samuel Moore is manager.

The Cutler Dry Kiln Company, Buffalo, has been incorporated with a capital stock of $20,000, and will build and equip a lumber dry kiln plant. The directors are Burwell S. and Clifford A. Cutler, H. T. Ramsdell, Samuel Ellis and Franklin D. Locke.

Philadelphia

PHILADELPHIA, PA., February 4, 1913.

An average volume of business was closed by manufacturers and merchants in January, with the closing week a trifle quiet. The bulk of the trade has been in single tools and small lots. No new inquiries covering any extended list of tools have come out. Tool builders and dealers continue to supply local railroads with preliminary data as to prospective tool requirements. New business develops from day to day in small power plant and elevator installations in connection with warehouse and manufacturing building. Special tools are in fair demand and in some instances prices have been advanced. Second-hand machinery and tools have been fairly active, particularly in connection with equipment of the modern type. Foundries, both iron and steel, report a continued fair run of orders. Castings for locomotive work have been in good demand.

The directorate of the Philadelphia Electric Company at a meeting last week decided upon the expenditure of $1,000,000 to increase the power capacity of its plants in this city. It is proposed to increase the capacity of the Christian street plant by 30,000 kw., while the Tacony plant will be increased 7500 kw. Additions to the buildings at these stations will be made to accommodate the new equipment.

The plant of Thomas Yearsley & Co., manufacturers and dealers in motors, dynamos and electrical equipment, 211 North Third street, was damaged by fire on January 28.

The Patapsco Iron Works, Baltimore, Md., has, it is stated, purchased a manufacturing site at Stockholm, Wicomico and Hamburg streets, in that city, on which it proposes to erect a new plant for the fabrication of iron and steel. Details as to the equipment are not available.

The Baldwin Locomotive Works is operating its local, Eddystone and Burnham plants at full capacity.

Recent orders include 25 Mikado locomotives from the Rock Island Railroad. Orders for eight engines have been received from the Duluth & Iron Range, and three Pacific type will be furnished the Duluth, Missabe & Northern Railway.

The Hyattsville Ice Company, Baltimore, Md., has been incorporated under the Delaware laws with a capital stock of $40,000. It is authorized to manufacture, buy and sell ice and refrigerating plants. The incorporators named are, Thomas O. Jones, Albert E. Smith and P. H. Tuck, all of Baltimore.

The John B. Stetson Company has begun the work of demolishing the buildings formerly occupied by Isaac A. Sheppard & Co., stove founders, at Third street and Montgomery avenue, and will immediately proceed to the erection of a large addition to its hat factory on the new site.

The Potter Mfg. Company has been incorporated under the Delaware laws with a capital stock of $100,000 to manufacture and sell car couplings, draft riggings, etc. The incorporators are David Levitt, W. H. Potter and James F. Boyd, all of Philadelphia. Information as to the proposed plans of the company is not available.

E. M. Harris has plans in preparation for an eight-story warehouse on Twenty-third street, below Arch street, having a frontage of 82 ft. and of irregular depth to tracks of the Schuylkill River, East Side Railroad and the Pennsylvania Railroad. Plans for elevators and power equipment are being considered.

The Harrison Safety Boiler Company will rebuild the small machine and erecting shop at its Seventeenth street and Allegheny avenue plant, which was recently damaged by fire. We are informed that no additional machine tools or other equipment beyond what has already been contracted for will be required.

The Conkling-Armstrong Company, Nicetown, Philadelphia, will build an addition 50 x 112 ft., three stories, to its plant. It will be used for offices and drafting rooms, as well as housing two departments for mechanical work in connection with the manufacture of terra cotta. No additional mechanical equipment will, however, be required.

Ballinger & Perrot, engineers, have completed plans for additions to the power house of Charles W. Young & Co., Twenty-sixth and Thompson streets. The building will be 36 x 64 ft. Bids will also be taken by the engineers for two return tubular boilers as well as the necessary piping, pumps, etc.

Chicago

CHICAGO, ILL., February 4, 1913.

Little business of unusual importance was transacted in machinery lines in the past week at Chicago. Failure of some of the pending negotiations to crystallize, particularly a desirable lot of machines for Michigan delivery, was the occasion for some disappointment but on the other hand several sales are noted. Interesting among these were the purchases of several lathes and drills from Chicago stocks. The Chicago & Alton Railroad is about to build a new machine shop and the Chicago & Northwestern Railroad has issued the following small list of tools:

One double head bolt cutter.
One 18-in. x 6-ft. lathe.
Two emery wheel grinders.
One power hack saw.
One 14-in. lathe.
One 52-in. turret lathe.
One 16-in. drill press.
One 24-in. shaper.
One 4½-in. boring bar.
One 32-in. lathe.
One combination power punch and shear.

Announcement has been made by the Chicago & Alton Railroad of an appropriation of $250,000 for the building of a new roundhouse and machine shop at Slater, Ill., the conversion of the present machine shop into a blacksmith and boiler shop and the enlargement of the power-house. In the new machine shop an electric crane of large capacity will be installed.

The By-Products Coke Corporation, South Chicago, has taken out building permits covering new construction the cost of which is estimated at more than $83,000.

The Temple Pump Company, Chicago, whose plant at Canal and Fifteenth streets was bought by the Burlington Railroad, has had plans prepared for a one-story factory, 125 x 465 ft. to be erected at Twenty-second street and Fifty-fourth avenue. It will cost $75,000.

The S. M. Mfg. Company, Chicago, has been organized with a capital stock of $5,000 to manufacture electrical supplies. The incorporators are F. M. Fairfield, J. L. Schureman and George M. McFedries. The company may be addressed in care of F. M. Fairfield, 39 South LaSalle street.

The Weaver Mfg. Company, Springfield, Ill., manufacturer of chucks, is preparing to build an addition to its plant and is buying new equipment.

E. J. Reynolds & Co., Utica, Ill., advise that they intend to buy a steam shovel this spring suitable for sand deposit operations.

Plans are being prepared by the People's Power Company, Moline, Ill., for increasing its power plant capacity by the installation of a new 12,500 k.w. turbo-generator set with the incidental equipment.

The Alton Gas & Electric Company, Alton, Ill., has closed for a site upon which to erect a new power house which will develop 4,000 h.p. A pumping plant of 10,000,000 gal. daily capacity and the necessary auxiliary and condensing apparatus will be installed.

The Boynton Engine Company, Waterloo, Iowa, has been organized with a capital stock of $100,000 for the manufacture of the Boynton scale, and also a gasoline engine ranging in size from 1½ to 15 h.p. J. F. Boynton is at the head of the new company.

The Herzog Iron Works, St. Paul, Minn., suffered a loss of $20,000 largely to machinery as a result of a fire January 27 which destroyed one building.

The Milwaukee Steel Foundry Company has filed notice of an increase in its capital stock from $10,000 to $150,000.

The Northwestern Bridge & Iron Company, Milwaukee, Wis., has been incorporated with a capital stock of $5,000 by H. H. Foote, Arthur Cockerton and Floy Foote.

The Wilboken Mfg. Company, Milwaukee, Wis., has been incorporated with a capital stock of $25,000 by W. E. Jones, G. H. Williams and W. S. Bowen.

The Wisconsin Wire Works, Appleton, Wis., is building a two-story addition, 46 x 60 ft., of steel and concrete, to be used for manufacturing purposes and to include the offices. The company manufactures paper mill machinery.

The National Gauge & Register Company, La Crosse, Wis., is undertaking the sale of stock in the amount of $25,000 for the purpose of erecting a new factory building.

The West Bend Barn Implement Company, West Bend, Wis., has been organized by J. C. Fitzgerald with a capital stock of $25,000 to manufacture a number of patented articles.

Cleveland

CLEVELAND, OHIO, February 4, 1913.

The market is in a very satisfactory condition. While no round lot sales or inquiries are reported, there is an excellent demand for single tools, these orders coming from widely scattered sources involving practically all the metal working industries. In the opinion of the dealers this well distributed demand represents a very healthy condition of the trade. Late last year fear was expressed by many manufacturers that general business would experience a slump during the present year, but this pessimistic talk has practically disappeared and the feeling regarding future conditions is generally optimistic. Most manufacturers are crowded with orders and few shops have any idle machinery equipment. Manufacturers, however, are following a conservative policy in adding additional equipment. There is a good volume of inquiries for handling equipment for coal mines and various other purposes. In electrical lines there is a good demand for small motors, but little inquiry for large installations. The foundry trade is holding up well. Users of steel castings are having trouble in getting deliveries as desired.

The Enamel Products Company, Cleveland, maker of stove parts and various enameled products, has increased its capital stock from $25,000 to $50,000 to provide additional capital for its growing business.

The Ric-Wil Underground Pipe Covering Company, Cleveland, has been incorporated with a capital stock of $40,000 by H. W. Diebolt, C. Cottweld, H. H. Jamison, John C. Barkley and J. P. Dempsey.

The plant of the Standard Top & Equipment Company, Cleveland, occupying three floors of a block on Huron Road, was burned January 31. Considerable machinery was destroyed.

The core department of the Chisholm & Moore Mfg.

Company, Cleveland, was burned January 31. As the company has one core oven in another part of its plant it is not expected that the fire will cause serious delay. The building, which was a two-story structure, will probably be rebuilt at once.

The Cleveland Railway Company is planning an expenditure of $854,000 for shops, extensions and repairs. The proposed improvements include new shops on Marceline avenue to cost about $500,000, and two new car barns.

A new plant is being established at Newcomerstown, Ohio, by the Vickers Account File Company, which will manufacture a line af account files. The necessary machinery equipment has been purchased.

The Cleveland Electric Illuminating Company has placed an order with the Cleveland office of the General Electric Company for a 15,000 kw. turbo generator for enlarging the capacity of its lighting plant.

Charles Schindler, Toledo, Ohio, manufacturer of toys and small novelties, will erect a new plant at Delaware avenue and Lexington street, in that city. The building will be 40 x 120 ft., with two stories and basement.

The Galion Metallic Vault Company, Galion, Ohio, will increase its capital stock from $25,000 to $100,000 and will build a large addition to its plant.

A company is being formed at Powell, Ohio, by Archie Richards, T. A. Canfield and others to establish a plant for the manufacture of bed springs.

The Galion Brass & Bronze Foundry, Galion, Ohio, has let a contract for the erection of a new plant. It will be of concrete construction, 30 x 100 ft.

The Meister Piano Company, Monoreville, Ohio, will add some new machinery equipment to its plant.

An expenditure of $1,000,000 is being planned in Akron, Ohio, for building a water-works pumping station and purification plant.

The Canton-Hughes Pump Company, Wooster, Ohio, is planning the erection of a new foundry to make the castings used in its plant which are now furnished by outside companies.

It is announced that the Weller-Thomas Company, Zanesville, Ohio, which was incorporated in New Jersey some time ago with a capital stock of $1,000,000 will erect a plant in Zanesville for the manufacture of fire engines. S. A. Weller is president of the company; F. O'Neil, secretary; William Winter, treasurer, and J. A. Thomas, general manager.

The Canton Engineering Company, Canton, Ohio, is planning the erection of a new three-story building.

The Toledo Drill & Tool Company, Toledo, Ohio, has been incorporated with a capital stock of $45,000 by C. I. Campbell, Robert L. Ellery, Frank L. Mulholland and others. This company was formed to operate the former plant of the Ellery Drill & Tool Company, which has been moved to Toledo from Portsmouth, N. H.

Cincinnati

CINCINNATI, OHIO, February 4, 1913.

The machine tool business is somewhat spotty. A number of local firms report January as being one of the best months of any similar period for several years past. Others whose export trade has fallen off lately are not quite as busy as they were two months ago. However, there is considerable railroad business in sight, and it is also reported that a number of the larger automobile manufacturers are buying tools for additions and replacements.

The jobbing foundry situation is in excellent shape, and with few exceptions the foundries in this vicinity are operating up to full capacity. The second-hand machinery business is only fair.

It is rumored that the Maxwell Motor Car Company, Detroit, Mich., has put out some tentative inquiries in this vicinity for machine tools to be used in refitting the old Brush plant in Detroit. It is understood commercial trucks will be manufactured.

The Queen City Punch & Shear Company announces that it has definitely decided to move its plant from Cincinnati to some nearby Indiana point. The company also plans to add sufficient equipment to double its present output.

The Cincinnati Maintenance Company, A. E. Rothermal, president, has been organized to operate an electrical equipment repair shop and to do general installation work.

The Ohio Oolitic Stone Company, Dayton, Ohio, has been incorporated with $200,000 capital stock, and will soon open a number of stone quarries near Bloomington, Ind., for which considerable machinery will be required. Joseph Kramer, Dayton, is president of the new company.

The Fulton Pit Car & Mfg. Company, Canal Fulton, Ohio, has been incorporated with $100,000 capital stock to manufacture mining cars. E. J. Nichter and E. E. Shilling are named among the incorporators.

The Buckeye Products Company, Cincinnati, dealer in foundry supplies, has leased new quarters at 919-921 West Fifth street, and will move from its present location on Eastern avenue within the next few days.

The Charles H. Wright Paper Company, Middletown, Ohio, has been incorporated with $100,000 capital stock by Charles H. Wright and others. A paper mill will be erected at an early date.

The Precision Tool & Mfg. Company, Dayton, Ohio, is a new incorporation with $25,000 capital stock to manufacture tools, dies and special machinery. C. DeLeon and J. A. Wortman are named among the incorporators.

The St. Mary's Machine Company, Wapakoneta, Ohio, is contemplating the purchase of additional machinery to manufacture a newly patented oil engine.

The Miami Cycle Mfg. Company, Middletown, Ohio, has increased its capital stock from $1,000,000 to $2,000,000. It is understood this increase was made to take care of the extensive additions to the company's plant, mentioned some time ago.

It is reported that George Gilderman, La Porte, Ind., has organized a company to erect a foundry in that city.

Bids will be opened by the city of Cincinnati, February 28, for the heating, electric lighting, refrigerating and other equipment for the Special Contagious Building of the New General Hospital. Plans and specifications are on file in the offices of Samuel Hannaford & Sons, Cincinnati architects.

The Lunkenheimer Company, Cincinnati, gave its fifty-first annual indoor entertainment to its employees on the evening of February 1. Over 4500 employees and their friends were present.

The Regle Brass Company, Marysville, Ohio, is erecting a building 50 x 160 ft. that will be used for the manufacture of plumbers' brass goods.

Indianapolis

INDIANAPOLIS, IND., February 4, 1913.

A bill has been introduced in the Indiana Legislature authorizing a bond issue of $300,000 and the levying of a special tax for the establishment and maintenance of a vocational and trades school, to succeed the Winona Technical Institute, Indianapolis, which has been in receiver's hands the last two years.

The Simplex Vehicle & Gear Company, Indianapolis, has bee nincorporated with $15,000 capital stock to manufacture vehicles and parts. The directors are Theodore Sanstrom, Maurice M. Kiefer and Samuel S. Helms.

The Indianapolis Aluminum Castings Company, Indianapolis, has been incorporated with $50,000 capital stock. The directors are W. M. Johnson, J. F. Bailey and Alfred M. Potts.

The Simplex Appliance Company, Indianapolis, has been incorporated, with $10,000 capital stock, to manufacture gas lighting appliances. The directors are William C. Hamilton, William Lee Bird and Isaac Born.

The Gypsum Tile & Plaster Mfg. Company, Indianapolis, has increased its capital stock from $35,000 to $47,000.

The Spring Steel Fence & Wire Company, Anderson, Ind., has been incorporated with $300,000 capital stock, to manufacture wire fencing, etc. The directors are William S. Poling, J. F. Stanley and T. H. Leaue.

The M. J. Hoffman Construction Company, Evansville, Ind., has increased its capital stock from $15,000 to $50,000.

The Acme Refrigerating Company, Hammond, Ind., has been incorporated with $10,000 capital stock to manufacture refrigerators, by William Wolter, C. D. Lewis and Adolph Bossa.

The Montpelier Mfg. Company, Montpelier, Ind., has been incorporated, with $50,000 capital stock, to do a manufacturing business. The directors are Ambrose G. Lupton, Leander E. Maddox and Alexander T. McDonnell.

The sale of the Ford & Johnson Company, Michigan City, Ind., has been confirmed by the Federal Court. The Midland Chair & Seating Company will succeed to the business and continue the plant in operation.

The Indiana General Service Company, Alexandria, Ind., has been incorporated with $500,000 capital stock to supply light, heat and power. The directors are C. M. C. Shanks, J. F. McMillan, A. O. Hoppes, C. L. Walling and Charles W. Weir.

The Peru Castings & Machinery Company Peru, Ind., has been incorporated with $25,000 capital stock to manufacture and sell machinery. The directors are C. E. McCampbell, R. M. Carter and I. H. Barbee.

The Great Western Mfg. Company, Laporte, Ind., manufacturers of bicycles, is having plans made for a two-story brick addition to its plant to be equipped with machinery.

The Hoosier Novelty Company, Shelbyville, Ind., has been incorporated with $10,000 capital stock to manufacture furniture, etc. The directors are R. E. Baker, R. J. Patterson and J. E. Tierney.

The Bond Oil & Gas Company, Vincennes, Ind., has been incorporated with $10,000 capital stock to drill for oil and gas. The directors are John J. Klemeyer, Henry C. Klemeyer, Charles A. Philippe.

The Foster Machine Company, Elkhart, Ind., has increased its capital stock from $25,000 to $150,000.

The Central South

LOUISVILLE, KY., February 4, 1913.

Business conditions in this part of the country are normal again after a considerable departure from that state. Not only are the swollen rivers again in their banks, making it possible for transportation facilities to be made use of without interruption, and affecting the sale of machinery definitely and favorably, but the temperature, which has been much too high for the season, is now about as low as usual for this time of the year. The builders of ice machinery have profited by the warm weather recorded this winter, reporting that many prospects have been developed because of the small amount of natural ice that has been stored during the current season. Other lines are without special features. There is a fair amount of business and a satisfactory volume of inquiries, and power equipment and special machinery are moving steadily.

Following a good many reports which have been received from Pineville and Middlesboro, eastern Kentucky coal centers, regarding the prospects for the establishment of a large power plant in that district, information has been received indicating that Stone & Webster, of Boston, are to build the plant. It will be a steam plant, not depending on water power, and in addition to serving several thriving communities, will furnish power for the operation of the large number of coal mines in that section. Both the eastern Kentucky operators and those in the Stonega, Va., district have been approached, and contracts have been actually signed in a number of instances. The plant will be one of the largest in this part of the country, the estimated cost being $1,000,000.

J. W. Johnson & Co., Jackson, Ky., have purchased about 30,000 acres of timber land on Lime Fork of the Kentucky River, in Letcher County, Ky., and will erect a large sawmill on the property. They are to build a 20-mile line of railway to connect with the Lexington & Eastern. The construction of a bridge will be required.

George W. Atkinson, Louisa, Ky., has been given a franchise for the operation of a water system in Paintsville, Ky., and will begin the construction of the plant within 30 days, according to a recent announcement.

The Wedgerite Chemical Company, recently organized in Louisville for the purpose of manufacturing explosives, has arranged for the construction of its plant south of the city. Six motors are to be purchased for the operation of the special machinery.

The Louisville Axe & Tool Company, located in Highland Park, a suburb of Louisville, is contemplating the replacement of a considerable part of its equipment, though actual decision to order the machinery has not been made. The capacity of the plant will be increased about 60 per cent. by the changes. J. D. Augustus is secretary of the company.

The Kosmos Portland Cement Company, Louisville, reports that it has under consideration plans for enlarging its plant at Kosmosdale, a few miles west of Louisville. Definite decision as to the improvement will be made shortly. Charles B. Horner is general manager of the company.

Ossian P. Ward, Louisville, who has specialized in structural designing, has formed a partnership with Edwin Glossup under the name of Ward & Glossup. The new firm will take over the business of McDonald & Dodd, architects, who have dissolved partnership effective September 1.

The American Brass & Plating Works, Louisville, has been incorporated with $8,000 capital stock by Thomas J. Hines, John J. Brennan and J. A. McGill. The new company succeeds the Houser Mfg. Company, 633 East Jefferson street. Thomas J. Hines, of Hines & Ritchey, coppersmiths, is at the head of the new concern. While no immediate improvements are to be made, the company expects to enlarge the plant as the needs of the business require.

The Cleveland Concrete Construction Company, Cleveland, Tenn., is preparing to build a plant for the manufacture of concrete sewer tile. S. W. Griffith is in charge of machinery purchases.

The Tennessee Hoop Company, Memphis, Tenn., has decided to increase its capital stock from $25,000 to $100,000, and to enlarge its manufacturing operations considerably.

The Burra Mining Company, Ducktown, Tenn., will enlarge its power plant, it is reported, and will install boilers and generators to operate its haulage system, pumps and electric lighting system.

Frank D. Rash, St. Bernard Mining Company, Earlington, Ky., is planning the purchase of a steam turbine for the power plant of the mining company, which also furnishes current for the maintenance of the city lighting system.

The Englewood Mfg. Company, Englewood, Tenn., is planning the erection of a knitting mill. It has $50,000 capital stock. R. H. Hicks, J. M. Wilson and L. A. Copenhaver are stockholders.

The American Creosote Works, Ltd., New Orleans, La., will build a creosoting plant at Louisville, Miss., it is announced. Power machinery and tankage will be required. Most of the equipment has been ordered. E. L. Powell, New Orleans, is manager of the company.

The Louisiana Pulp & Paper Company, New Orleans, La., has been incorporated with $150,000 capital stock, and will take over and reconstruct a plant at Braithwaite. Special paper-making machinery will constitute the equipment purchases. Charles F. Hubbs is president of the company.

Birmingham

BIRMINGHAM, ALA., February 3, 1913.

January business with dealers in machinery and machine tools was satisfactory. The volume of business was up to the standard and the demand extended to a wide range of goods. Engines, pumps and boilers have been selling steadily. Building operations are on the increase. Coal mine development and railroads are factors in the trade, while activity at sawmills is another feature.

Application has been made at Waycross, Ga., for incorporation of Waycross Gas & Power Company to build and operate a gas plant. The capital stock is $100,000, with privilege to increase to $500,000. L. J. Cooper and George W. Deen, Waycross; Albert Fendig, Brunswick; J. L. Farnsworth, Jacksonville, Fla., and Edward L. Richa, Baltimore, Md., are the incorporators.

The West Tampa Gas Company, West Tampa, Fla., has applied for a charter with a capital stock of $100,000. It will extend its gas mains from Tampa into West Tempa. Peter O. Knight, Tampa, is interested.

The Athens Ice & Coal Company, Athens, Ga., has been incorporated with a capital stock of $20,000 and privilege to increase to $100,000. It will build a plant for the manufacture of ice. George and B. S. Dobbs are the incorporators.

The plant of the Florida Ice & Coal Company at Jacksonville, Fla., will be enlarged. A 50-ton ice plant will be installed.

The New York Ice Company, Punta Gorda, Fla., will enlarge the ice plant purchased from the De Soto Mfg. Company. Additional machinery and a 1000-ton storage plant will be installed.

W. J. Upchurch, A. J. Stanaland, J. T. Dixon and others will organize a company with $12,000 capital stock to build and operate an ice plant at Thomasville, Ga.

The Georgia Harrow & Implement Company, Tifton, Ga., has been incorporated with a capital stock of $15,000 with privilege to increase to $50,000 to manufacture harrows, etc. J. D. Cook, R. S. Short, J. H. Brown and others.

The Moultrie Sawmill Company, Moultrie, Ga., has been incorporated with a capital stock of $5,000 and privilege to increase to $25,000. It will manufacture lumber. L. E. Morgan is interested.

The Robinson Company, Pensacola, Fla., has been incorporated with a capital stock of $10,000. It will manufacture lumber. R. M. Robinson is interested.

L. C. Yeager of Tallahassee, Fla., will establish sawmill on tract of 3000 acres of land near Woodville, Fla.

Garbutt & Donovan of Lyons, Ga., will establish extensive sawmill plant at Vidalia, Ga.

Jesse A. Moore, Canton, Ga., will establish a marble plant at La Grange, Ga.

The Davis Chemical Company, Baltimore, Md., will establish a phosphate plant on a tract of 1250 acres of phosphate land near Bartow, Fla.

The Southern Structural Steel Company, San Antonio, Tex., will establish a plant for the manufacture of portable cages and jails in Birmingham, Ala. D. F. Youngblood is president and W. M. Cornett secretary, both of San Antonio. The Birmingham investment is to be $50,000 initially.

The Wehkit Nurseries Company and the Treasure Island Co., each with a capital stock of $250,000, have asked for a charter at Leesburg, Fla. Propose to manufacture boxes and crates. E. H. More is president of both companies.

J. E. Davidson, Norfolk, Va., contemplates erecting a box factory in Savannah, Ga.

E. M. Benson, Nashville, Tenn., contemplates establishing a cannery at Abel, Ga.

John S. Foley, president of the Magnolia Land Company, heads a movement to establish cannery and syrup factory at Foley, Ala.

J. W. Walker will enlarge crate and basket plant at Cuba, Ala., installing new machinery.

The Georgia Lumber Company, Savannah, Ga., will construct dry kilns at its Pierpont plant in place of those burned with a loss of $10,000. J. B. Cheney is vice-president.

Mobile Sugar Development Company, Mobile, Ala., has been incorporated with a capital stock of $10,000. Proposes to establish sugar, syrup and molasses factories in Mobile and vicinity. G. E. Newsome, Mobile, general manager. L. L. Dugger, Mobile, and L. J. Knox, Calvert, Ala., among the incorporators.

The Punta Gorda Stores Company, Punta Gorda, Fla., has been incorporated with a capital stock of $350,000 to operate a turpentine plant, etc. C. M. Carrier is president.

A plant for the manufacture of turpentine cups will be established in Orlando, Fla., by the Georgia & Florida Turpentine & Metal Company, Valdosta, Ga., by D. W. Currie of Orlando. The capital stock of the company has been increased from $10,000 to $50,000.

St. Louis

ST. LOUIS, Mo., February 3, 1913.

Business in the machine tool market continues rather quiet, with no large lists appearing and dealers only fairly well occupied with inquiries for and sales of single tools, replacement orders and some second hand tool business. There seems no specific reason apparent for the continued quiet, and the information on that point is not sufficiently well defined to name the actual cause. Dealers, however, are not pessimistic over the future, when spring opens and hope for renewed activity.

The Laclede Christy Clay Products Company, St. Louis, has purchased a large acreage of clay land at Vandalia, Mo., and pending preparation of plans for a branch plant at the site will ship the clay into St. Louis for manufacture.

J. Rovitsky, J. M. Bulkey, A. D. Branham and others have prepared plans for the construction and equipment of a $20,000 laundry plant in St. Louis at 705 Garrison avenue.

The Roderick Buggy & Implement, Hannibal, Mo., with $25,000 capital stock, has been incorporated to equip a plant for the manufacture of farm tools, etc. T. N. Cousins is president.

A. Lair, S. E. Patton, William McCause and others have incorporated a company with $25,000 capital at Frederick, Okla., to equip a plant for the manufacture of a patented incinerator.

The main buildings of the Reisch Brewing Company, Springfield, Ill., were burned January 3. No estimate has been made of the probable replacement requirements. The loss is about $100,000.

The Schlueter Mfg. Company, St. Louis, Julius A. Schlueter president, has purchased a site for a $20,000 addition to its plant for the manufacture of tinware and galvanized iron ware.

The Huttig Sash & Door Company, St. Louis, reorganized with $1,000,000 capital stock, under the laws of Delaware, has been given permission to use $741,841 of the amount in business in St. Louis, having completely rehabilitated its plant destroyed by fire about a year ago.

The city steam heating plant at Sedalia, Mo., was partly destroyed by fire January 31. The extent of the replacement requirements has not been determined.

The St. Louis Chair Company, St. Louis, has been incorporated for the manufacture of chairs. The incorporators are W. W. Ellerbrake, H. F. Bente and others. Its plant plans are not yet announced.

The Berryville Canning Co., Berryville, Ark., with $10,000 capital stock, has been incorporated by W. J. Douglass, J. W. Freeman, J. E. Reynolds and J. A. Bobo and will equip a canning plant.

The city of Durant, Okla., has plans for the construction and equipment of a sewage disposal plant to cost about $20,000.

The Russellville Water & Light Company, developing hydro-electric power, will install emergency steam equipment as a result of recent trouble caused by high water damage.

The Pioneer Pole & Shaft Company will equip a plant at Camden, Ark., for the manufacture of poles, shafts and other wooden articles.

The Fidelity Land Company, New Orleans, La., recently noted as having drainage plans, will be in the market shortly for pumping plant for drainage purposes. Ernest J. Coulon is president.

The St. Louis Cordage Company, St. Louis, is preparing to build an addition to its plant on adjoining property.

The Grand Island Culvert & Metal Works, Grand Island, Neb., has completed the erection of an additional building which will afford approximately double the capacity of the previous plant.

The plant of the Cushing Electric Light & Power Company, Cushing, Okla., which will supply both Cushing and Bartlesville, Okla., wil linclude a 175 h.p. engine and a 150 kw. generator as well as allied equipment.

An electric light system for Hinton, Okla., has been authorized in a bond issue voted on at a recent election and the mayor will have charge of the work.

The city of Purcell, Okla., through a trustee, has purchased the electric light, water and ice plants there and will prepare plans for the improvemept of the equipment.

An electric light plant to cost about $12,000 will be installed at Stonewall, Oka., including a 50 hp. generator and relative equipment. The work will be supervised by J. T. George.

The Dustin Oil & Gas Company, Dustin, Okla., of which J. H. Swafford is manager, has entered the market for equipment. It was recently incorporated for $100,000.

The Choctoka Oil & Gas Co., McAlester, Okla., with $150,000 capital stock has been incorporated by J. C. Farrington of Tusla, Okla.; W. T. Meadows of Holdenville, Okla., and J. H. Bacon of Muskogee, Okla.

The Arkadelphia Milling Company, Arkadelphia, Ark., will install a sawmill with 25,000 ft. daily capacity.

The Arkansas Mil & Lumber Company, Little Rock, Ark., has been incorporated with $100,000 capital stock by Charles Borner, J. T. Howell and W. E. Strong, will build a mill, having arranged for $125,000 additional capital secured by a bond issue.

The H. H. DeWitt Lumber Company, Oakland City, Ind., has plans for large mill equipment at Little Rock, Ark., involving $125,000 investment through a separate corporation to be formed.

A large sawmill is to be equipped at Purvis, Miss., by the Hand & Sheppard Lumber Co.

Texas

AUSTIN, TEXAS, February 1, 1913.

The machinery and tool trade situation in Texas and the Southwest continues to be satisfactory. Plans are developing for the establishment of many new manufacturing plants that will involve the installation of a large amount of machinery. Irrigation projects are also being carried out in south and west Texas and in Arizona and New Mexico. In Mexico the revolutionary conditions show little if any improvement, and industrial affairs in that country are in bad shape except in the Tampico territory where the oil development operations still continue without interruption.

The Industrial Cotton Oil Company has awarded the contract for the erection of the main building of its new cotton seed oil mill at Denison to John Brown-

bridge of that place. About $50,000 worth of machinery will be installed in the mill.

The Corsicana Brick Company will enlarge and otherwise improve its brick manufacturing plant at Corsicana.

R. S. Root and associates will add 10 new kilns, two new presses, a new engine and a drying room to their brick manufacturing plant at Denton.

S. L. Cooper has submitted a proposition to the Chamber of Commerce looking to the establishmnet at Longview of a cordage manufacturing plant. The Chamber of Commerce is also promoting the establishment of a cotton mill there.

An election of taxpayers has been ordered to be held February 17 at Spur to vote on the proposition of issuing $25,000 of bonds for the installation of a waterworks plant and the laying of a distribution system.

Eugene Nolte and associates will install an ice factory and cold storage plant at San Antonio at a cost of $250,000, the plans and specifications for the proposed plant having been prepared by the Henry Vogt Machinery Company, Louisville, Ky.

The Ehlers Engineering Company, La Grange, has finished plans for the proposed municipal sewer system at Elgin.

The Victoria Safe & Lock Company, Victoria, has been organized with a capital stock of $40,000 to manufacture safes and locks. B. F. Lander, C. S. E. Holland, R. L. Daniel and others are incorporators.

The Farmers Cotton Oil Company will erect a cotton seed oil mill at Kosse. Among those interested are W. C. Blaylock, L. F. Gibbs and J. B. Brothers.

The Galveston Commercial Association is promoting the setablishment at Galveston of a large machine shop and plant for the manufacture of engines.

Walker Smith will rebuild his cold storage plant at Brownwood, which was recently destroyed by fire. He will also install a peanut factory.

The Buenze Lumber Company is installing a woodworking plant and planing mill at Laredo.

W. G. Warden will install a machine shop and establish a garage at Glen Flora.

The annual budget of the Gulf, Colorado & Santa Fe Railway Company which has just been announced provides for the expenditure of $1,500,000 for improvements in addition to an expenditure of about $400,000 for additional rolling stock. Among the improvement items are the following: Shops, engine houses and turntables, $260,000; water and fuel stations, $160,000; station buildings and fixtures, $125,000; bridges, trestles and culverts, $50,000; block and other signal apparatus, $38,000; telegraph and telephone lines, $28,000; shop machinery and tools, $26,000; fencing right of way, $20,000; improved frogs and switches, $5,000; interlocking plants, $1,500. The budget does not include the terminal yards at Brownwood, Texas, where the Santa Fe has already started work on a $500,000 system of new division terminals, or the new Galveston Union depot and general office building of the Gulf, Colorado and Santa Fe, to cost approximately $500,000, and on which construction work has started.

The United Verde Copper Company is erecting the buildings for its large new smelter at Clarkdale, Ariz. The general equipment of the plant will be as follows: Five 42 x 26-ft. blast furnaces; three 19 x 100-ft. reverberatory furnaces; five 15-ft. converters; large receiving and storage bins for ore and coke; sampling mill thoroughly equipped with the latest machinery; dust chambers, stacks and ore-handling system; designed according to the latest engineering practice. The shops will be equipped with modern machinery. The warehouse and main buildings will be steel structures, designed with a liberal allowance of operating space. Approximately 10,000,000 bricks and 8000 tons of steel will be used in the construction of this plant. A modern brick plant to make the brick is in course of construction. The material will be handled in and around the plant by a modern industrial system, including the latest design of electrical locomotives, conveyors and trams. It is estimated that it will require two years to complete the new plant.

Bids for the construction of a new sewer system in Nogales, Ariz., will be opened on February 15. There will be nearly 35,000 ft. of pipe laid, varying in size from 6 to 16 in.

The Tuscon Farms Company is constructing a system of irrigation in the Santa Cruz Valley near Tuscon, Ariz., at a cost of $750,000. About 6000 acres of land will be reclaimed. More than 30 pumps will be installed.

The Arnold Mining Company has adopted plans for a 50-ton ore concentrating plant that it will install at its mines at Santa Cruz, State of Sonora, Mexico.

The Arizona-Sonora Mining Company will install a 50-stamp mill at its mine near Magdalena, State of Sonora, Mexico.

Rafael Pardo and associates have revived their project of installing a large hydroelectric plant on the Santiago River in the State of Jalisco, Mexico, and the construction of a system of power transmission lines to Tepic and a number of other cities and towns and mining camps within a radius of 150 miles of the proposed power station.

The Pacific Coast

PORTLAND, ORE., January 28, 1913.

While little of special importance has developed in the machine tool market business is quite active in a small way and a few heavy tools are being ordered. A material increase is expected during the spring. The greatest activity at present is in woodworking and general machinery, notwithstanding the fact that many logging camps are unable to operate on account of snow. Orders for lumber are accumulating rapidly and the mills are hampered by a shortage of logs. Sales of general saw and planing mill equipment have been heavy and plans are now taking shape for a number of large plants to be built during the spring and summer. Numerous orders have also been placed for logging locomotives. A great deal of machinery is being built for shipment to Alaska and large purchases from stock will probably be made when Alaska traffic opens. Agents for canning equipment are getting a heavy business both from the salmon and fruit interests.

The Nickerson-MacFarlane Machinery Company, Tacoma, Wash., plans to build a four-story concrete machine shop building and will put in other important improvements.

J. W. and L. J. Irwin have bought out the machine shop of Frank Lyon at North Bend, Ore., and will put in numerous improvements.

The North Pacific Auto & Wagon Works, Portland, is having plans drawn for a new plant.

The Western Farquhar Machinery Company, Portland, recently incorporated here with a capital stock of $50,000, has leased quarters in the Fisher-Thorsen Building on East Salmon street.

Plans are under way for a large car shop for the Corvallis & Eastern line of the Southern Pacific system at Albany, Ore. Boilers, motors and machine tools will be installed.

The Seattle Car & Foundry Company, Seattle, Wash., has received an order for 40 logging cars from the Yosemite Lumber Company, Merced Falls, Cal.

The Port of Seattle, Wash., has let harbor contracts amounting to over $400,000, and is having plans drawn for a steel sidewheel ferryboat to cost about $80,000.

The Whitman Lumber Company, recently organized, will equip its plant at Baker, Ore., with a 14-in. single bandsaw and resaw, double edger, trimmer and a 400-hp. engine.

It is reported that two large sawmills are projected in the vicinity of Coos Bay, Ore.

The St. Paul & Tacoma Lumber Company, Tacoma, Wash., is installing 16 large machines in its new planing mill and is considering the construction of an electric generating station.

The Pacific Fixture & Cabinet Company, recently organized in this city, plans to build a plant at a cost of $70,000.

The Spokane Gas Company, Spokane, Wash., is starting work on a number of improvements and has let a contract at about $20,000 for electrifying the machinery now driven by steam.

The Light Granite Company has purchased a site at Everett, Wash., and will install a stone-cutting plant.

The Spokane Toilet Supply Company, Spokane, Wash., is preparing to install a large amount of new laundry machinery.

The Seattle Car & Foundry Company, Seattle, Wash., is working on an order for 80 box cars for Shanghai, China.

The Whitney Engineering Company, Tacoma, Wash., has recently taken orders for Heisler locomotives from the Standard Lumber Company, Sonora, Cal.; the Walville Lumber Company, Walville, Wash., and the Wenatchee Valley & Northern Railroad, Leavenworth, Wash.

The town of Wenatchee, Wash., is considering the installation of a municipal electric light plant.

A. & C. Feldenheimer, this city, manufacturing jewelers and opticians, plan to install a large factory in the new Platt Building.

The Klamath Falls Creamery Company, Klamath Falls, Ore., is preparing to install a 5-ton ice machine.

The Pacific Fruit Express Company expects to start work shortly on a large ice plant at Nampa, Idaho.

The Pacific Lumber Company, Scotia, Cal., is figuring on many improvements for the coming summer, including a 750-kw. low-pressure turbine generator to utilize exhaust steam.

R. T. Earl, formerly with the Hammond Lumber Company, is now superintendent and manager of the Eureka Foundry Company, Eureka, Cal. This company intends to spend $10,000 for improvements and will take up the manufacture of donkey engines.

Eastern Canada

TORONTO, ONT., February 1, 1913.

W. G. Harris of the Canada Metal Company, Fraser avenue, Toronto, has bought 3½ acres of factory property with railway sidings at the corner of Royce and Campbell avenues. The property adjoins the site of the Standard Sanitary Company's building.

The Town Council of Walkerton, Ont., has decided to submit a by-law to the ratepapers at an early date providing for a loan of $10,000 to the Canada Saddlery Hardware Company of that place on condition that the shareholders of the company raise $3,000.

M. Beattie & Sons, Welland, Ont., manufacturers of dredges and contractors' plant, are arranging to greatly increase their plant. When completed it will employ several hundred extra mn.

The Royal Motor Company, Strathroy, Ont., has been incorporated to manufacture automobiles, with $500,000 capital stock.

A. C. Fraser of the Fraser Hardware Company, Galt, Ont., whose block was destroyed by fire January 27, has decided to erect a new building at once.

On February 25 the ratepayers of St. Catharines, Ont., will vote on two by-laws, one to carry out an arrangement with William J. Bigger of Hamilton, Ont., for the establishing of a large jam factory, and the other to ratify the agreement concerning the Goodrich Tire Company, Akron, Ohio, which proposes to commence building its branch factory in St. Catharines in the spring and to keep up an annual payroll of $100,000.

Industrial Commissioner B. J. McCormick, Welland, Ont., has completed arrangements for another large cotton plant to be erected in that town in addition to the Empire Cotton Mills, in course of erection now. The company has a capital stock of $500,000. Plans have been completed for a main building, 100 x 250 ft., two stories, of brick and stone construction. The contracts are to be let in 30 days. Two hundred and fifty hands will be employed at the start. A site has been procured east of the Grand Trunk. It is expected that the building will be completed, machinery installed and the plant in operation at the end of October.

A company, to be known as State Electric, Ltd., has been formed with Montreal and Toronto capital, to manufacture electric commercial vehicles at Walkerville, Ont., and plans are being prepared for a factory to cover more than 40,000 sq. ft. The directors of the new company are H. Timmins, N. A. Timmins, W. S. Hutchinson, C. E. Archibold and S. Carsley, all of Montreal; A. O. Tate and D. A. Dunlap, Toronto. Albert Klatschmidt of Detroit has been appointed factory manager.

The plant of the defunct Chelsea Green Hardware Company, London, Ont., has been purchased by an Aurora, Ill., firm for a branch factory. The company will open the local office next week, and will operate with about 30 men at the start. Chairman Spittall of the Manufacturers' Council and Industrial Commissioner Henderson are negotiating with other firms, and expect to close deals next week for locating an industry in London.

The Noyes Machine Company, manufacturer of propellers and brass specialties, Portland, Maine, proposes to establish a Canadian plant at St. John, N. B. The manager of the company was in that city a few days ago and stated that his company has chosen St. John for its Canadian factory, on account of its splendid shipping facilities. The company is not asking any special privileges from the city, nor is it seeking extra capital. It has made arrangements for a building on Nelson street.

The Grand Trunk Railway Company will begin the relaying of its line between Strathroy and Windsor, Ont., with 100-lb. rails.

The W. E. Woelfle Shoe Company, Berlin, Ont., will soon be ready for business in its new factory building on Wilmot street, Berlin. The building is two stories, 45 x 100 ft.

Trade Publications

Waterproofing and Iron and Steel Paints.—Trussed Concrete Steel Company, Detroit, Mich. Booklet. Size, 5¼ x 7¾ in.; pages, 96. Describes some of the Trus-Con products for structural work, which include waterproofings, dampproofings and technical paints. In addition to the descriptions of the various materials, there are engravings of contracts upon which they have been used, together with reproductions of testimonial letters. Estimating data and specifications for the use of these products are included.

Lathe Turret.—Acme Machine Tool Company, Cincinnati, Ohio. Circular. Concerned with the set-over type of turret which is furnished for 16 and 18 in. lathes. The turret is adapted for outside turning, facing, boring and recessing with a single point tool and is hexagonal in form with six tool holes fitted with set screws. An illustration of the turret is given, together with a brief description.

Molding Machine.—Midland Machine Company, Detroit, Mich. Pamphlet. Lists a number of roll-over molding machines, a jolt-rammed core machine and a stripping plate machine. All of these are illustrated and there are also brief text descriptions. An illustrated description of the core machine and one of a power jolt ramming roll-over molding machine appeared in *The Iron Age*, April 27, 1911, and October 17, 1912, respectively.

Leather Belting.—Gandy Belting Company, 740 West Pratt street, Baltimore, Md. Folder. Calls attention to a belt which has been in service for 27 years without any interruption except such as were caused by repairs to the machinery. A letter, giving the details of the service rendered by this belt, is reproduced.

Upright Drilling Machines.—J. E. Snyder & Son, Worcester, Mass. Catalogue. Contains illustrations, brief descriptions and condensed tables of specifications for a number of upright drilling machines, ranging in capacity from 20 to 46 in. Compound, geared revolving and plain tables can be supplied as well as belt or motor drive. A foundation plan giving the various dimensions is reproduced and mention is made of accessories, such as chucks, sockets and sleeves.

Blower.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Refers to the use of blowers for conveying cotton and for cooling electric motor and generator armatures after they come from the baking oven. One of the fans used for the latter purpose is illustrated.

Power Hammers.—Beaudry & Co., Inc., 141 Milk street, Boston, Mass. Circular. Concerned with a line of hammers which are built in two types, one for light and heavy railroad, machine and general job forging and the other for plating, drawing, swaging, collaring, spindle making and general manufacturing. Particular attention is paid in the circular to the second of these hammers, which was illustrated in *The Iron Age*, October 3, 1912.

Incline Railway and Skip Hoist Machines.—Otis Elevator Company, Eleventh avenue and Twenty-sixth street, New York City. Catalogue. Illustrates the widely varied and exacting duties which hoisting engines of this class are called upon to perform. The incline railways are divided into three classes, tourist and passenger inclines, traffic inclines and commercial inclines. A number of these are shown and briefly described. Mention is also made of the skip hoist and incline baggage hoist which the company builds.

Trucks.—George P. Clark Company, Windsor Locks, Conn. Bulletin J. Covers an extensive line of platform, table, baggage and express trucks, which are made in a variety of different sizes and styles. All of these trucks are illustrated and briefly described and condensed tables of specifications are included.

Coal and Ash Handling.—Guarantee Construction Company, 140 Cedar street, New York City. Pamphlet. Illustrates a few of the more typical installations made by this company for the economic handling of coal and ashes in power plants. The apparatus used includes suspended concrete bunkers above and in front of the boilers, apparatus for conveying the coal to these bunkers and the Darley suction conveyor for handling the ashes. In connection with the installations, there are brief descriptions supplemented by plan views, sectional elevations and interiors.

Lever Punches and Shears.—Watson-Stillman Company, 190 Fulton street, New York City. Catalogue No. 90. Size, 6 x 9 in.; pages, 40. Illustrates many types of punches and shears, together with considerable tabular data. A few screw punches and power-driven machines are shown, and space is also devoted to fittings and repair parts.

Bucket Conveyor.—C. W. Hunt Company, West New Brighton, N. Y. Catalogue No. 12-9. Size, 6½ x 9¼ in.; pages, 64. Describes a number of prominent and interesting installations in which the company's noiseless bucket conveyor is used for handling coal, ashes, phosphate, rock, cement, etc. Details are given showing the superiority of the pivoted bucket construction and the advantage of the peculiar pawl drive used is pointed out. A number of illustrations showing the different types of Hunt cut-off valves for use in coal chutes are also included.

Lamp Changer.—W. N. Matthews & Bro., St. Louis, Mo. Folder. Devoted to a device for changing burnt-out electric lamps without the use of a ladder. An illustration of the device in use is included.

New Tools and Appliances

This is essentially a news department for which information is invited.

Sliding Head High-Speed Drilling Machine.—A 21-in. sliding head high-speed drilling machine has been recently brought out by J. E. Snyder & Son, Worcester, Mass. The machine is intended to handle drills ranging from ⅛ to ⅞ in. in diameter. A bevel gear drive is used for the spindle, which has lever feeds of 0.003, 0.006 and 0.01 in. per revolution. A crank wrench in connection with a steel pinion and rack on the column raises or lowers the table and the sliding head is balanced and arranged for rapid adjustment to any desired position. The overall hight of the machine is 76 in., it is possible to drill to the center of a 21-in. circle and the traverse of the spindle is 6¼ in. With the spindle and the table in their extreme positions, the distance between them is 29 in. and the floor space required is 16 x 40 in. The machine is driven ordinarily by a 2½-in. belt, but motor drive can be furnished if desired.

Roller Mandrel.—A roller mandrel consisting of a small hardened roller that rolls back and forth in a slot cut along the face of the shank has been developed by the Alert Tool Company, Philadelphia, Pa. The slot is milled off center and when the roller is rolled toward the left it drops below the outer circumference of the mandrel and appears above it when the motion is in the opposite direction. To prevent the roller from falling out of the slot there are two band springs in recesses in the side of the mandrel and there are two corresponding ones in the roller to prevent the springs from touching the work. Both ends are centered and a flat is milled on one end to receive a lathe dog or carrier. There is also a shoulder on this end which acts as a brace or stop for the work. In use, the work is slipped on the mandrel when the roll is depressed and it is only necessary to roll the roller toward the right until the work jams to cause it to bind. The greater the strain placed on the work toward the right the harder it binds and to release the work, it is simply neccssary to revolve it toward the left. In addition to this type of mandrel, ones with standard Brown & Sharpe and Morse taper shanks are made in stub form.

Centering and Cutting-off Machine.—A new centering and cutting-off machine has been placed on the market by the Holton Company, Jackson, Mich., which is completely equipped with phosphor-bronze bearings, the front boxes being provided with means to compensate for wear. Tight and loose pulleys 8 in. in diameter with a 4-in. face are mounted on the countershaft, which runs at 300 to 350 r.p.m. The machine is driven by a three-step cone pulley, over which a 3½-in. belt runs. The capacity of the machine is gas pipe, ranging from ⅛ to 1½ in. in diameter, or tubing with a maximum external diameter of 2 in. For handling this range of work, sixteen collets varying in diameter by ⅛ in. are provided and it is possible to operate the level controlling them while the machine is in motion. The centering device with which the machine is equipped can be readily attached or detached or left in place without interfering with the cutting-off operation. In operation the shaft which is to be centered revolves and the center drill and countersink are forced against it by a lever movement and quickly withdrawn. It is then possible to throw the entire device back on a hinged joint, thus leaving the front of the collet unobstructed for the removal and insertion of the work. A rotary pump which is directly connected to the shaft of the machine supplies oil or cutting compound to the tool and a double-head tool vise is operated by a pilot wheel and screw and enables cutting on two sides of the stock to be performed simultaneously. Cast-iron shields are supplied to protect the gears.

Shaft Hanger with Ball Bearings.—A new type of ball-bearing shaft hanger, which is made in both the drop and post forms, has been placed on the market by the Gurney Ball Bearing Company, Jamestown, N. Y. The design of the hanger is compact and the yoke ring swings in a cored housing which extends inward around the yoke. Adjustment in all directions can be made and it is possible to swivel the hanger universally.

Customs Decisions

Cuban Scrap

The Board of United States General Appraisers has decided that the reciprocity treaty between this country and Cuba is sufficiently broad to cover scrap iron. The treaty grants a reduction of 20 per cent. ad valorem on articles "the product of the soil or industry of the Republic of Cuba." The collector at Philadelphia, where the merchandise was entered, held that scrap iron was not a "product" in the generally accepted sense of that word, and accordingly exacted the regular duty prescribed in paragraph 118 of the tariff act. F. B. Vandegrift & Co., and O. G. Hempstead & Son, the importers, claimed that the scrap was entitled to the reduction in duty specified in the convention. In finding for the importers, Judge Fischer says that in a narrow sense it is a question whether scrap is a "product" since it results from wear and tear. He holds, however, that a broad construction should be placed on treaties and that Congress undoubtedly intended to benefit by tariff reduction all classes of Cuban goods.

Spare Propeller Shaft

A protest by J. H. Winchester & Co., raising the validity of the classification imposed by the customs authorities on a spare steel propeller shaft imported for the tramp ship Hughenden, was decided adversely to the protestants. It appeared that during a voyage to New York the Hughenden broke its propeller. While in port she replaced the damaged shaft by one taken from the hold. Before sailing for England, a new shaft to be used for emergency purposes reached New York on another steamship and was transferred to the Hughenden and stored in the hold. The collector held the new shaft dutiable under the American tariff at 45 per cent. ad valorem as a manufacture of metal. It was alleged in behalf of the importer that the bringing in of the propeller shaft should not be regarded as an "importation," but as the tackle, apparel and furniture of a foreign vessel. The board holds that the transfer of cargo from one vessel to another constitutes an importation within the meaning of the law. The claim for free entry was denied and the collector affirmed.

Machines Not Machine Tools

The board has overruled a protest by Knauth, Nachod & Kuhne and others regarding the classification under the tariff act of textile cutting machines; embossers and stampers used for gold lettering of leather, cardboard and similar heavy materials; machines for stapling paper boxes and for cutting and shaping paper, and machines for use in bookbinding. They were all assessed for duty at 45 per cent. ad valorem under the provision in the law for manufactures of metal. It was unsuccessfully claimed that the articles are "machine tools" as that term is used in the tariff, and dutiable at 30 per cent. ad valorem.

Forged Gear Blanks

A protest by Hensel, Bruckmann & Lorbacher was overruled. Forged steel gear blanks were assessed at 30 per cent. ad valorem under paragraph 123 of the tariff act as forgings of steel. They were claimed to be dutiable according to value per pound at 1.9c. a pound under paragraph 131, which provides for steel bars. The articles are disk-shaped pieces of hammered or forged steel and the claim made was that the blanks are cut from hammered steel bars. Judge Fischer says, it appears clear that the gear blanks as imported are not the steel bars referred to in the law.

Wire Goods

Robert B. Ways, in behalf of the Baltimore & Ohio Railroad Company, objected to the assessment made by the collector at Baltimore on Christmas tree wires, consisting of pieces of twisted metal, painted or stained in various colors. Duty was assessed at 45 per cent. ad valorem under paragraph 199 of the present law, as manufactures of metal. The importer claimed the goods to be "toys" and as such dutiable at the rate of 35 per cent. ad valorem. Similar claims by John H. Boden & Co., regarding candle holders and tree wires, were also overruled.